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Issued March 20, 1908.

U. S. DEPARTMENT OF AGRICULTURE.

BUREAU OF STATISTICS—BULLETIN 65.

CHARLES C. CLARK, Acting Chief of Bureau.

U. S. Department of Agriculture

RUSSIA'S WHEAT TRADE.

BY

I. M. RUBINOW.

MAR 26 1908
U. S. Dept of Agriculture

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[Continued on page 3 of cover.]

Issued March 20, 1908.

U. S. DEPARTMENT OF AGRICULTURE.

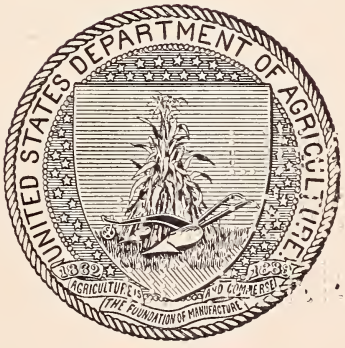
BUREAU OF STATISTICS—BULLETIN 65.

CHARLES C. CLARK, Acting Chief of Bureau.

RUSSIA'S WHEAT TRADE.

BY

I. M. RUBINOW.



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LETTER OF TRANSMITTAL.

U. S. Department of Agriculture,
Bureau of Statistics,
Washington, D. C., July 29, 1907.

Sir: I have the honor to submit the accompanying manuscript concerning the conditions under which the wheat of Russia is sent to market, and especially to foreign markets, prepared by Dr. I. M. Rubinow, formerly in the Division of Foreign Markets. Before the completion of this bulletin Doctor Rubinow was transferred to the Bureau of Statistics in the Department of Commerce and Labor, but, notwithstanding, he kindly offered to finish the work, and this was done with the courtesy of that Bureau.

Russia is one of the greatest competitors of the United States in European wheat markets and a thorough understanding of the Russian wheat trade can not fail to be of service to wheat growers, buyers, and exporters in this country. The information contained in this bulletin is nearly all matter that has heretofore existed only in the Russian language, so that this bulletin presents it for the first time in English.

This description of Russia's wheat trade follows in natural sequence a study of the conditions under which wheat is produced in Russia, published as Bulletin No. 42 of this Bureau about a year ago.

It is respectfully recommended that this manuscript be published as Bulletin 65 of this Bureau.

Very respectfully,

C. C. Clark,
Acting Chief of Bureau.

Hon. James Wilson,
Secretary of Agriculture.

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RUSSIA'S WHEAT TRADE.

GRAIN TRADE ORGANIZATION.

GOVERNED BY THE EXPORT BUSINESS.

LARGE PROPORTION OF CEREALS SOLD TO OTHER COUNTRIES.

In Russian agriculture and grain trade the export trade is of much greater importance than in the United States. During the decade 1893-1902 the average annual quantity of grain transported on all Russian railways and waterways—that is, approximately the total quantity of the five principal cereals which entered trade for more distant markets than those of the immediate neighborhood—was equal to 10,512,000 short tons. During the same period the average quantity of these cereals exported was 7,957,000 tons, or almost 76 per cent. In 1903, 10,492,000 tons were exported out of 14,635,000 tons transported, or 72 per cent, and in 1904 the exports were 10,396,000 tons or 72 per cent of the 14,414,000 tons transported. While no transportation statistics for subsequent years are available, still, as the exports since 1904 have materially increased, the proportion is probably equally great.[a]

In the American grain trade the exports also play a very important rôle; but, measured by the same relation, this rôle is far less important than in Russia. For the four years for which the total quantity of grain transported on American railways is stated in the reports of the Interstate Commerce Commission, 1901-1904, it equaled on an average 29,126,000 tons annually; while the average annual exports of grain during the same period were only 6,175,000 tons, or 21.2 per cent. Moreover, it decreased from 33.1 per cent in 1901 to 22.2 per cent in 1902, 19.5 per cent in 1903, and only 10.5 per cent in 1904.

It is evident, therefore, that in Russia more than in most other countries the internal commerce in grain is an exceptionally important phase of the export trade, and that the organization of the latter can not be understood without a previous study of the former.

[a] The annual report of the Russian Ministry of Ways and Communications for 1904 arrived too late to be utilized in the preparation of this report, except in a few instances.

PRIMARY MARKET.

PEASANTS UNABLE TO HOLD THEIR GRAIN.

While modern methods have been to some extent introduced into the Russian grain trade, the peasant still follows antiquated customs. Being in great need of ready money immediately after harvest, when the tax collector comes around, he is usually forced to sell his grain as early as possible, regardless of the price. More than half the peasants are illiterate, and even when not so they are seldom readers of newspapers and do not know the conditions of the market.

SELLING UNDER DISADVANTAGES.

The buyer is either a local speculator or the agent of some firm of grain dealers in a distant city. The local speculator has an advantage in that often he is the local banker and the creditor of the peasant. Agents of the local speculators are often awaiting the arrival of peasants with their loads of grain some distance from the markets and make energetic efforts to direct them to their respective principals. The profits of the local buyer may be judged from the fact that the commission for his service often reaches 10 per cent of the purchase price of the grain.

The primitive character of these commercial transactions is shown by the fact that in many countries on the Volga the local buyers, instead of competing with one another, determine by lot by whom each wagon load of grain as it appears shall be bought.[a]

The more fortunate peasants who live convenient to large markets are able to make personal deliveries of their grain and are slowly learning modern methods and defending their interests. Perhaps nothing can better illustrate the recent beginning of this progress than the following narrative:

"On the market place in Nikolaiev (one of the most important southern ports) I had an opportunity to observe a fact which a short time ago would have been altogether incredible. The peasants on arrival at the market with their grain were asking: 'What is the price in America according to the latest telegram?' And what is still more surprising, they know how to convert cents per bushel into kopecks per pood."[b]

---

[a] Report on the organization of the grain trade. Appendix II. 1902. (In Russian.)

[b] Digest of the Report of the Special Commissioner of the Ministry of Finance, Counselor of State Miller, commissioned to the main trade centers for the study of the new tendencies in the grain trade. Supplement to the Messenger of Finance, 2, 1903. (In Russian.)

This understanding of market conditions on the part of the peasants is still remarkably uncommon, even in centers of the grain trade, and is never met with in the interior, remote from railroad stations.

The owners of large estates who do not rent out their land do not deal with small market brokers. They usually have large stocks of grain to dispose of, and, in order to realize greater profits, they avoid one in the series of middlemen which, in the organization of the Russian grain trade, is a very complex one. The large estate owner often deals directly with the large commission merchant and the exporter.

THE MIDDLEMEN.

CREDIT AND COMMISSIONS.

In the succeeding stages of the trade the changes which have taken place during the last twenty years are more noticeable. These have been brought about by the introduction of modern institutions—railroads, credits, etc.—which will be more fully described in subsequent pages.

In the old system of marketing grain, business was conducted on a cash basis and was, accordingly, centralized in the hands of comparatively few people. Large merchants in centers of production bought grain from small brokers or from large estate holders, and sold it to merchants in the main distributing centers or to exporters. This method of conducting the business required large amounts of free capital, and the concentration of business was especially noticeable in the export trade, which was practically monopolized by a few firms in St. Petersburg and Odessa.

Western commercial methods gradually permeated the export trade, and as this trade rapidly grew in importance the entire internal grain trade became more modernized.

Most important among the influences affecting the domestic trade was the introduction of the credit system. This system greatly enlarged competition, since it enabled people with small capital to compete. Exporting firms either sell to some foreign importing house or buy in the internal markets on commission for a foreign firm. In either case the exporting firms usually cash their drafts upon foreign purchasers immediately after shipment of the grain, so that comparatively little capital is required to conduct the business.

Before the railway system was as extensive as at present it was the custom of exporting firms to store large quantities of grain in warehouses, but since the extension of the railway system an effort is usually made to ship as quickly as possible, and thus avoid the heavy expenses incident to storing. With few exceptions elevators in Russia are not equipped with machinery for cleaning or otherwise improving the condition of the grain and are used simply as store-

houses. Similar influences extend even to the internal movement of grain. This does not mean that grain actually moves very rapidly over Russian railways, but there is always an effort to expedite shipment. Large numbers of dealers handling grain with little capital and usually on credit are interested in expediting movement as much as possible.

Another change is the introduction of the commission business in place of a straight purchase. Southern exporting firms frequently keep their own commission agents in the wheat area instead of dealing with large local houses. On the other hand, all exporting houses now act more and more frequently in the capacity of commission agents for foreign houses. Finally, within recent years, brokers have appeared who volunteer to bring large producers into direct communication with foreign importers; they act as agents in all the complicated transactions. Large producers are attracted to this system by the hope of saving commissions to middlemen or, at least, of reducing them to a single payment for the services of the agent. But this system sometimes proves disastrous to producers by throwing the entire speculative risk directly upon them.

The general tendency is toward a more rapid turnover with the assistance of credit and to some degree toward the elimination of middlemen. The latter tendency is not asserting itself very strongly as yet.

In the ordinary run of business, many middlemen stand between Russian wheat producers and foreign consumers—the small local broker who buys from the peasant, the large local dealer, the exporting firm, and the foreign house. This, however, is the minimum number. In most localities, additional middlemen appear between the local primary buyer and the local large dealer; this is especially the case in localities not well provided with railway facilities. Where transportation is by water, the shipper of a barge of grain may become an intermediary between the primary buyer and the large internal grain house. Thus the large grain firms along the Volga, who sell and ship to the exporter, mainly to St. Petersburg, buy grain from small local dealers who are not primary buyers. Russian grain may therefore go through the hands of at least four middlemen before reaching the foreign market, and two or three more may intervene before it finally reaches the consumer.

STATE AND RAILWAY CREDIT ON GRAIN.

AIDS TO QUICKEN THE MOVEMENT TO MARKET.

Perhaps the most important influence which has helped to develop the commission business and has also stimulated the entire grain trade was the railway and State Bank credit to grain shippers.

This interesting financial venture had its origin in the early eighties through the private efforts of one important railway system. At that time the great majority of Russian railways were still in the hands of private corporations. In 1884 the Southwestern Railway Company, in order to increase its traffic and to meet the competition of other railways, began to grant credit against shipments of grain to Odessa and to Königsberg. As its funds for that purpose were soon found insufficient, it entered into combination with private banking firms. Credit transactions rapidly increased in number and the railway company soon petitioned the Ministry of Finance for a credit from the Imperial State Bank because of the great expense of private credit. The Ministry readily perceived the great economic importance of such a system, and that, with the railways acting as agents of the State Bank in these credit transactions, the benefits would become diffused among a large number of actual grain producers and not be limited to large dealers.[a]

The decision of the Ministry was embodied in the law of June 14 (26), 1888, the main provisions of which were as follows: All the railways were made the agents of the State Bank for the granting of credit upon grain shipments; furthermore, the railways were empowered to establish grain warehouses and to issue warrants upon grain and to establish agencies for the sale of grain upon which credit had been granted. By the law of January 24 (February 5), 1889, the railways were also permitted to grant credits from their own resources, provided that, in the opinion of the Ministry of Finance, the financial condition of the railways was such as to guarantee the payment of all the fixed charges. By this latter law the railways were also permitted to obtain credits from private banking institutions (if they could do so at less expense than from the State Bank.)[b]

The financial operations under this law remained comparatively small until 1893, when the State Bank decided to extend this activity "in order to prevent the too rapid marketing of grain and enable the producer to wait and distribute the marketing throughout the year." Thus the State Bank began granting loans either directly to producers or through local banks, besides loans through the railways as before.

The original limit to loans granted by the railways was 60 per cent of the value of the grain, and the operation of the law of 1888 was limited to three years. The time limit was extended in 1891 and the limit of the loan increased to 80 per cent. A second extension of

[a] Getreidehandel in Russland, by Dr. Gr. Jolos, in Conrad's Handwörterbuck der Staatswissenschaften, Vol. IV.

[b] Vîestnik Finansov, Ukazatel Pravitelstvennyk Rasporîazheniĭ No. 10, p. 97, 1899.

the period during which the law was effective took place in 1894, and finally the limit was entirely removed. The extent of these operations is shown in Table 1.

In addition to the State Bank, private banks grant a great deal of credit on grain. In 1899 the total credit upon grain granted by private banking establishments was $69,308,000; in 1890, $70,953,000, and in 1901, $72,381,000.[a] Thus some substitute for warehouse certificates and for credit operations of elevators is found. The quantity of grain on which loans are advanced is considerable and the grain trade is considerably assisted thereby, but it is questionable whether the desired effect of holding the grain is thereby accomplished, since only 5 per cent of the credit granted by the State and by railways is given to producers, the principal beneficiaries being the grain merchants, who are thus given the means to quicken trade.

TABLE 1.—*State Bank and railway loans on grain, 1893–1901.*[a]

Year.	Loans advanced by State Bank directly.	Grain securing direct loans from State Bank.	Loans advanced by State Bank through railways.	Total loans advanced by State Bank.	Total loans advanced by railways.[b]	Grain securing all railway loans.[b]
	Dollars.	*Centals.*	*Dollars.*	*Dollars.*	*Dollars.*	*Centals.*
1893	13,781,809	21,925,812	1,354,598	15,136,407	(c)	(c)
1894	22,461,510	52,790,106	4,246,677	26,708,187	5,780,000	12,486,000
1895	27,360,083	61,836,896	4,955,030	32,315,113	6,986,000	13,421,000
1896	16,513,301	27,394,446	3,495,874	20,009,175	8,610,000	14,495,000
1897	13,712,289	17,815,414	5,621,106	19,333,395	11,706,000	12,623,000
1898	11,910,480	13,314,533	6,672,411	18,582,891	13,644,000	17,577,000
1899	12,421,535	16,143,905	8,004,784	20,426,319	15,093,000	20,089,000
1900	15,083,051	18,585,180	10,277,222	25,360,273	16,576,000	22,752,000
1901	19,777,462	(c)	17,920,249	37,697,711	25,886,000	32,056,000

[a] Supplement to "Report on the importance of a regular organization of the grain trade," pp. 85–88.
[b] Contains the loans of money advanced by the State Bank (third column) as well as from private banks, and from the resources of the railway companies.
[c] Data not available.

SYSTEM OF MARKETING.

ELEVATORS AND GRADING.

While the commercial methods of the Russian grain trade have undergone considerable change, they are still very much behind in the matter of an organization.

In general it may be said Russia has been striving for many years to adopt the methods of the American grain trade, but as yet with very different success. In the world market some of the competitors of the Russian wheat grower have an advantage over him in their more economical methods of marketing grain. Saving of expense in marketing may not be important to producers where they are limited in number and have a monopoly of a certain article, and where selling prices are enough to cover waste. But the Russian grain pro-

[a] Same source as Table 1.

ducer, who has no such monopoly in the international grain market, is the main, almost the only, sufferer.

The main feature of the Russian grain trade may best be described by indicating its negative qualities. It has few elevators, or, rather, while many elevators exist, only a very small part of the grain passes through them. There is no ironclad system of types and grades; the grain which enters trade must, in the majority of cases, preserve its identity, and be sold by examination of sample. In other words, in this respect the grain trade has not changed very much. The cleaning and sorting of the grain, which was a function of the older grain dealers, with their large warehouses, were almost abolished without any organized elevator system being established.

The decline in the quality of Russian grain as a result of this change in commercial methods will be indicated presently. The conditions of Russian agriculture, which make the creation of an elevator system difficult, make it also desirable. The large proportion of impurities and the lack of regular grading of Russian wheat depress prices of Russian grain, as compared with American, in the European market; on the other hand, lack of sufficient storage facilities and need of ready cash force the grain to overcrowd the internal as well as the international market in the beginning of the commercial season, and thus have a further depressing effect upon prices. The agricultural crisis of the eighties and early nineties has especially affected Russian agriculture, and has therefore made the need of elevators still more acute, since, in the effort to improve prices, the improvement of Russian grain and storage at times of depressed prices are of the utmost importance.

IMPURITIES.

The increasing number of complaints from European importers about the proportion of impurities in Russian grain and the discrimination against it in European markets, which became noticeable during the agricultural crisis of the eighties, caused the Russian Government to undertake an extensive investigation to determine the degree to which Russian grain exports suffer from these causes. During the six months, May to October, 1893, careful analyses of all shipments of the four principal cereals were made in 17 leading ports; the main results of the investigation are shown in Table 2.

It will be noticed that, while most of the grain contained comparatively small quantities of impurities (72.5 per cent contained less than 3 per cent), in a considerable part of the exports the admixture of impurities was important. Thus 18.1 per cent of the grain contained from 3 to 6 per cent, and 9.4 per cent of it contained over 6 per cent of impurities, higher proportions of impurities not being shown.

Still more important is the fact that wheat, the most prominent and highest priced cereal, suffered most severely: 57.5 per cent of the exported wheat contained less than 3 per cent of impurities, 22.4 per cent contained from 3 to 6 per cent; and 20.1 per cent contained over 6 per cent; so that in almost one-half of the wheat exported the presence of impurities was considerable, and it is easily seen how the presence of impurities in such a large part of the exports affects the general price in European markets.

TABLE 2.—*Impurities in chief cereals exported from Russia, May 1–November 1, 1893.*[a]

Kind and proportion of impurities.	Percentage of exports of designated grains containing specified proportions of impurities.														
						Wheat shipped from the following ports and customs districts.									
	All grains.	Barley.	Oats.	Rye.	Wheat.	Rostov.	Odessa.	Nikolaiev.	Novorossiisk.	Berdiansk.	Mariupol.	Eisk.	Taganrog.	Prussian frontier.	Baltic ports.
All impurities.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Less than 1 per cent...	12.7	20.4	16.5	9.9	6.3	4.7	4.1	5.1	.....	7.0	7.8	7.1	21.4	10.9	10.8
From 1 to 2 per cent..	35.1	49.8	34.9	26.3	26.4	17.3	15.6	31.4	4.8	63.2	43.2	13.6	42.4	25.2	63.5
From 2 to 3 per cent..	24.7	19.2	28.9	35.5	24.8	21.4	29.6	28.8	2.5	22.0	37.0	32.7	20.9	34.8	19.1
From 3 to 4 per cent..	11.5	7.1	12.4	18.7	12.9	11.7	14.6	27.6	6.4	3.9	8.4	16.2	6.3	16.4	4.1
From 4 to 5 per cent..	4.7	1.9	4.7	6.8	6.2	5.8	14.0	6.9	3.1	.8	1.7	4.4	2.9	6.9	.4
From 5 to 6 per cent..	1.9	.4	1.4	1.5	3.3	3.3	7.1	.1	5.0	2.1	.....	5.7	1.3	1.9	.....
6 per cent and over...	9.4	1.2	1.2	1.3	20.1	35.8	15.0	.1	78.2	1.0	1.9	20.3	4.8	3.9	2.1
Sand and dust.															
Less than 0.5 per cent.	54.1	26.2	35.2	42.8	83.6	86.4	68.4	85.4	83.8	93.8	87.8	75.3	93.3	66.9	85.2
From 0.5 to 1 per cent.	32.3	49.1	43.6	34.8	15.5	13.4	28.8	14.6	16.2	6.2	12.2	24.3	6.6	26.0	12.0
1 per cent and over...	13.6	24.7	21.2	22.4	.9	.2	2.8	.....	.....	.....	.....	.4	.1	7.1	2.8
Grass and grass seeds.															
Less than 1 per cent..	60.3	68.8	44.7	26.2	66.9	88.8	38.4	62.6	53.4	67.8	64.6	96.8	79.7	39.9	57.3
1 per cent and over...	39.7	31.2	55.3	73.8	33.1	11.2	61.6	37.4	45.6	32.2	35.4	3.2	20.3	60.1	42.7

[a] "Results of the investigation of the impurities of the four chief cereals (wheat, rye, oats, and barley) exported abroad from May 1 to November 1, 1893, through the main custom-houses of the western land and sea frontier." Published by the section of grain trade, department of commerce and manufactures of the Ministry of Finance, Russia. St. Petersburg. 1894. (In Russian.)

The impurities usually found in Russian grain are sand, dust, grass, and seeds—cereal and other. Data in regard to sand show that it is not present in larger quantities than the other impurities, and, moreover, that wheat suffers less from this impurity than other grains, for less than 1 per cent of the shipments of wheat had 1 per cent and over of sand, while 1 per cent of sand was found in over 20 per cent of the other cereals. The content of grass and grass seeds was also lower in wheat than in rye or oats. On the other hand, wheat contained a considerably greater quantity of other cereals, mainly rye, but also barley, etc. The summer exports contained more rye and the autumn exports more barley. Altogether,

31.1 per cent of the total exported wheat contained some admixture of rye and 37.1 per cent some admixture of barley.

Considerable difference was noticed in the quantity of impurities at various ports. Thus the port of Novorossiisk, to which the wheat of Northern Caucasia gravitates, shows by far the worst condition; the small shipments of wheat from the Baltic ports contained the least percentage of impurities. These ports obtain their grain from the Volga provinces.

The grain shipped over the Russian frontier, originating chiefly in the western provinces, was comparatively clean, only one-fifth of it containing more than 3 per cent of impurities. The southern ports, the most important in the wheat trade, appear in a less favorable light; but here also a vast difference may be observed between the individual ports. The eastern ports, such as Rostov and Eisk, which deal in Northern Caucasian wheat, send dirtier wheat than Mariupol, Berdiansk, or Nikolaiev.

It is noteworthy that some of the ports where the greatest amount of impurities was found show a very moderate quantity of dust and sand; namely, Novorossiisk, Rostov, and Eisk. The Baltic ports and the Prussian frontier, with a low percentage of impurities, show a relatively large proportion of sand and grass seeds. These peculiarities will be of importance when the causes of impurities are considered.

Since the impurity of the Russian wheat was admitted to be increasing, data referring to 1893 can not be quite conclusive. On the basis of these data it was asserted in Russia at the time that the situation was not so bad as it had been pictured by foreign dealers in Russian wheat. In a special investigation of the position of Russian wheat in the British market, published in an official Russian organ in 1902, some data may be found as to the impurities in Russian wheat as determined by British buyers.[a]

An examination made in London of 24 samples of wheat showed the mean percentage of impurities to be 16.9, the proportion varying from 7 to 42 per cent. Five samples contained 10 per cent or less of impurities; 9 samples contained from 11 to 20 per cent; 3 samples contained 22 per cent; 2 samples contained 30 per cent; and in 3 other samples the percentage of impurities was, respectively, 26, 28, and 42. A more careful analysis of 6 samples of Russian wheat by a milling firm of Hull showed a mean percentage of 7.2 per cent of barley and 6.6 per cent of other seeds and impurities, so that the percentage of wheat was only 86.2. The quantity of barley mixed with the wheat

[a] Causes of decline of imports of Russian wheat into England, by Dr. I. M. Goldstein. Russian Economic Review, December, 1902. (In Russian.)

varied from 2 to 12 per cent; that of other impurities from 3.6 to 9.35 per cent, and of impurities in general from 11 to 18.7 per cent. In Sheffield a still more careful analysis was made of 10 samples of Russian wheat with the following result:

TABLE 3.—*Results of a Sheffield analysis of Russian wheat.*

Composition.	Average of ten samples.	Variations.
Wheat:	*Per cent.*	*Per cent.*
Good	81.31	74.0–92.5
Light	3.35	0.0–15.0
Total wheat in the samples	84.66	75.5–94.7
Rye	6.32	0.0–21.7
Oats and barley	3.95	0.0–11.35
Other seeds	4.78	0.5–10.7
Stone, dirt, etc	.29	0.0– 1.6
Total	100.00	

If the Russian and English analyses are equally trustworthy, then the conclusion seems possible, in so far as can be determined from these samples, that the deterioration of Russian export wheat was very rapid. In any case the data quoted above are sufficient to show what an uncertain article Russian wheat often is. Ten per cent of impurities might be considered of frequent occurrence.

To the effect produced by the presence of so many impurities must be added the harmful effect of mixing different types of the same cereal. Even when wheat does not contain any sand, stones, grass, seeds, rye, or barley it often contains wheat of very different types, of which southern Russia has created so many.

CAUSES OF IMPURITIES.

The causes of the impure condition of Russian wheat, or grain in general, may be divided into two groups, depending upon methods of production and of marketing.

In earlier days the large estate holders, the noblemen, were the only agriculturists who had any surplus available for distant markets; the peasant serfs produced only sufficient for home consumption.[a] The nobleman was not usually pressed for ready cash and had labor gratis; he could afford to clean his grain before selling it. The substitution of money economy for natural economy in the peasant household incident upon the emancipation of the serfs, together with the imposition of taxation upon the newly liberated serfs, forced the peasants to market a considerable proportion of their grain. The necessity for money caused a rapid extension of

[a] A description of land ownership before emancipation will be found in Bureau of Statistics Bul. No. 42, Russia's Wheat Surplus, pp. 31–44.

cereal culture, and a goodly part of the grain appearing on the market is now produced by peasants. On the other hand, the constant need of money by the owners of large but mortgaged estates causes a more rapid disposal of the grain produced, and the crop is often sold before it is harvested; and the increasing cost of labor makes the cleaning of the grain by the primitive methods more expensive.

The peasants' methods of harvesting and thrashing, which have been described in a previous bulletin,[a] are not conducive to keeping the grain clean. The ignorance of the peasants in regard to seed selection explains the mixing of types, both in seeding and after harvest. That these agricultural methods are in a measure responsible for the impurities is shown by the higher percentage of impurities found in eastern and Caucasian ports, in the vicinity of which farming methods have improved but little while in some western ports the situation is very much better.

Yet these causes do not altogether explain the rapid increase in the impurities, nor the increase in the proportion of rye and barley in exported wheat. It is usually true that the dearer the grain the greater the amount of impurities present, and that rye and barley do not contain much wheat. It is universally admitted that a considerable proportion of the impurities caused by admixtures is voluntary and systematically added by the exporters. This is stated even in the official reports of the investigation in regard to impurities, many data from which are quoted above. It is true that the eventual buyer in foreign markets does not pay for impurities, discounting the stipulated price by arbitration, and that the Russian exporter who pays the freight is also forced to pay for transportation of the impurities. But the established mistrust of Russian grain continued to have its effect. The exporter knows that it will be easier to discount for an excess of impurities than to obtain additional pay for an unusually clean shipment, and therefore he usually grades down any consignment of grain which is above the average. There also remains the speculative element, the small exporter with neither capital nor reputation, who expects to gain from the difference of price, even after the discount for impurities has been made.

The exporter in his turn is to some extent the victim of the local commission merchant or broker from whom he buys his grain. After the conditions of the sale have been agreed upon, according to the sample, the broker often attempts to and frequently succeeds in increasing his profits by adding a quantity of inferior grain of the same kind, other cereals, or sand, and then settling with the original

[a] Bureau of Statistics Bul. No. 42, pp. 55–61.

producer on the basis of the price he receives for the adulterated grain. In short, there is a considerable lack of organization and of business honesty which works to the detriment of grain producers, though many grain dealers profit by these methods.

ELEVATORS.

EFFORTS TO ESTABLISH A SYSTEM.

An organized system of modern elevators, with mechanical appliances for quickly and cheaply cleaning the grain, would lessen the amount of impurities present, and a system of grading and classification would prevent mixing the different grades of the same cereal.

A commission established in 1888 to consider measures of relief against the fall in agricultural prices in 1883–1887 decided upon the necessity of building, at Government expense, elevators at railway and waterway stations and storage houses in cities and towns not connected with railway systems. It favored granting to such institutions the exercise not only of technical, but also commercial, functions, such as advances of loans and the privilege of trading in grain on commission. The commission further recognized the advantages of an inspection system, but considered compulsory inspection premature, and recommended the introduction of an optional inspection system in the export ports.

In addition to the introduction of the elevator system, of which more will be said later on, special measures were suggested for improving the condition of grain for export. In 1892 a commission to consider the entire subject of the grain trade recommended Government control of all grain exports, with absolute prohibition of exports containing over a definite maximum of impurities.

Seven years later the conference of 1899, which reconsidered the entire grain trade, again recommended Government control of exports; but its recommendations were of a less drastic nature, substituting for absolute prohibition of exports below the standard a system of graduated fines. Yielding to these recommendations, the Ministry of Finance introduced a plan of such legislation; but it met with serious opposition on the ground that it might lead to an undesirable decline of exports. The plan was not adopted.

The Commercial and Industrial Congress, which convened in Nizhni-Novgorod in 1896 during the Pan-Russian Exposition, also reiterated the necessity for elevators and storage houses which should improve the condition of grain, reduce the cost of transportation and storage, and advance loans; and the Congress pointed out the desirability of extending Government assistance to all efforts to build elevators, and also recommended a gradual introduction of

optional grading by the existing elevators acting in harmony with one another.

But while the agricultural class, bent upon obtaining a higher valuation of grain, invariably advocated Government regulation of elevators, the grain trade saw in the lack of order and organization a smaller evil than in the paternal attitude of the Government. What the grain dealers feared was a compulsory system of inspection and a limitation of impurities to which Government ownership of elevators might lead. But the "let-alone" policy seemed to threaten the country with a constant decrease of grain exports, which the Government considered very undesirable, and therefore the entire problem was very thoroughly discussed anew at the conference on improvement of the grain trade, which was called together in 1899. At this conference Government representatives met the representatives of estate holders, of the grain trade, and of the railways. The representatives of each class endeavored to bring the elevators under its own control. The estate holders held that the elevators must be turned over to the zemstvos; the railroads wanted the elevators put into their hands. As a compromise the conference resolved to encourage the building of elevators, no matter by whom, so long as they were subject to Government control; public elevators should be encouraged, but private parties should not be refused the right to build them. The building of elevators and storehouses should be left to private initiative, but the large central elevators should be built according to one general plan. A system of compulsory grading was again found premature, but efforts at grading from time to time were to be encouraged.

Finally, when the extensive special council in regard to the needs of rural industry was called together in 1902, it was recognized that while the elevators built within the preceding fifteen years have not realized all the advantages expected, yet they have not been useless; but that, while their mechanical functions, such as storing, cleaning, drying, loading, etc., have been utilized, their commercial functions, such as the introduction of a system of grading and inspection and trade by inspection certificates, depended upon the entire organization of the grain trade and were impossible where such organization did not exist. In other words, the hope in elevators as such had to be abandoned, and the necessity for extensive changes in methods of agriculture and commerce was recognized.

ELEVATOR STATISTICS.

With the exception of a small private elevator in Riga, the first public elevator in Russia was erected in Eletz, a grain trade center, by the local zemstvo in 1888, with a capacity of 400,000 poods

(about 240,000 bushels) of wheat. The following year a large private elevator was opened in St. Petersburg with a capacity of 900,000 bushels. Since then the majority of the elevators have been built either by the railways or by the Government and turned over to the railways.

According to the latest data there were on January 1, 1900, under the control of the railways, 62 elevators with a total capacity of 11,200,000 bushels, and 198 warehouses, some of which had no mechanical appliances for handling grain, with a combined capacity of 14,300,000 bushels. The dates of their erection throw some light upon the extent to which expectations were realized.

One elevator was built in 1890 on the Southwestern Railway in Odessa, with a capacity of 900,000 bushels; 5 were built in 1891, 3 in 1893, 2 in 1894, 27 in 1895, 19 in 1896, 4 in 1897, and none from 1897 to 1900. While data since 1900 are lacking, it is probable that a few elevators have been built since that year. The average capacity is small, being only 180,000 bushels of wheat.

The largest elevators besides the one in Odessa are 2 in Nikolaiev, with a combined capacity of 1,060,000 bushels, built in 1893; 1 in Saratov, built in 1896, with a capacity of 600,000 bushels, and 1 in Moscow, built in 1895, with a capacity of 820,000 bushels. If these 5 elevators are excepted, the remaining 57 have a combined capacity of only 7,820,000 bushels, or an average capacity of only 137,000 bushels each.

The building of elevators, which received great impetus in the middle of the nineties, has suddenly almost ceased, because it did not realize expectations. Not only has the capacity of the elevators remained small, but, judged by the quantity of grain handled, the facilities have not been fully utilized. In 1893 the quantity of grain handled amounted to 117.2 per cent of the capacity of the elevators; in 1897 it increased to 161.8 per cent of the capacity; but in 1899 it decreased to 115.9 per cent—at best about one and one-half times the capacity.

Some elevators have done a great deal better than the average; thus, one Nikolaiev elevator, with a capacity of 110,000 bushels, has handled as much as 3,000,000 bushels; the one at Moscow [a] 2,700,000 bushels, or over three times its capacity. But even the most active Russian elevators do not stand comparison with the American, and a great many did not handle throughout the year a quantity equal to their capacity. The total quantity entering elevators annually probably does not much exceed 18,000,000 bushels; assuming an equal quantity for the warehouses, only 36,000,000 bushels (about 1,000,000 tons) pass through these storage houses out of a total of from

[a] The Eletz elevator, with a capacity of 240,000 bushels, handles each year 1,200,000 bushels, or five times its capacity.

10,000,000 to 11,000,000 tons transported on railways and waterways, or from 9 to 10 per cent. Evidently the elevators have not yet affected the grain trade very much.

Ordinary grain-storage houses, sometimes provided with simple apparatus for unloading grain, are more popular. Most of these were built between 1894 and 1896. A few have a considerable capacity, notably the one in Ekaterinoslav, with a capacity of 690,000 bushels; Windaw, Rybinsk, and Chistopol, 600,000 bushels each; but a vast majority are small, the average capacity, these 4 excepted, being only 40,000 bushels.

Most of the railways which carry large quantities of grain have few elevators, and these do not constitute a system. The only exception is the Ryazan-Ural Railway, which on January 1, 1900, had 26 elevators and 121 grain-storage houses, with a combined capacity of 9,540,000 bushels.

In comparison with the American elevator system these figures appear quite insignificant. While complete statistics of the capacity of American elevators are not available, it is sufficient to state that Chicago alone had 89 elevators in 1906, public and private, with a combined capacity of 63,545,000 bushels, or two and one-half times the combined capacity of the elevators and plain storage houses of the entire Russian railway system, and that the 19 so-called regular elevators recognized by the Chicago Board of Trade have a capacity almost equal to the combined capacity of the 62 Russian elevators and 198 warehouses.

OVERCROWDING THE MARKET.

Besides the function of cleaning and grading the grain, another argument in favor of establishing an elevator system in Russia is found in a lack of sufficient storage facilities, which often deprives producers of the opportunity of holding grain and tends to cause gluts in the markets.

Lack of sufficient storage facilities is not the only cause of the backward condition of the Russian grain trade nor can an elevator system entirely cure it, but that insufficient storage facilities aggravate the condition there can be no doubt. The peasant almost always, and often the large estate owner, is forced to sell grain as soon as harvested, or sooner, because of need of ready cash. The organization of state and railway credit, previously discussed in this bulletin, to some extent relieved this need of cash, but it afforded the estate owners greater relief than the ordinary peasants. It will subsequently be shown how the unsatisfactory condition of the country roads in winter compels the delivery of grain to the railway station in early autumn.

The lack of storage facilities in the village is another factor working in the same direction. When grain is delivered to a station where there is no elevator it should be shipped at once. If it is not, the result is likely to be congestion at the stations, with millions of bushels of grain lying in the open air and suffering from the damaging influences of inclement weather.

HIGH COST OF MARKETING.

Finally, the absence of sufficient elevators makes the cost of intermediate steps in the marketing considerably higher, and, in view of the lower price which Russian wheat commands as compared with the American, every small increment in the cost of marketing is a serious matter to the Russian wheat grower. When the loading and unloading of grain from wagon to car and from car to barge or steamer are done mostly by human labor, the cost of the grain is naturally higher, notwithstanding the low cost of labor. It is officially estimated [a] that the port expenses alone in various Russian ports amount to from 2.5 to 6 kopecks per pood (3.57 to 8.56 cents per cental, or 2.14 to 5.13 cents per bushel) of wheat.

To show the technical backwardness of the Russian system of marketing, it is sufficient to mention the one operation of loading grain into the ship. The loading of 3,000 to 4,000 short tons of wheat in St. Petersburg takes from 5 to 10 days; in Libau the average loading is about 500 tons per day, or 6 days for a cargo of 3,000 tons. In the Black Sea ports, many of which have elevators, the loading is done somewhat faster, or about 1,000 tons per day; so that a cargo of 5,000 to 6,000 short tons of grain is loaded in less than 6 days.

Compare this with elevators in New York, which load 6,000 short tons in from 3 to 4 hours, or with the record made by a steamer at Fort William, where 198,000 bushels of wheat were put on board in 1 hour and 57 minutes, or at the rate of 3,046 tons per hour, or more than 50 tons per minute.[b]

CLASSIFICATION.

In their main object—that of introducing a universally accepted system of grading and trading by certificates of inspection instead of by sample—Russian elevators have failed up to the present time. In the beginning of enthusiasm for elevators, suggestions of immediately introducing an obligatory system of grading were many; in 1890-91 the Government took many preliminary steps toward

[a] Report on "The importance of a proper organization of the grain trade, the conditions to be satisfied, and measures for a gradual introduction of an organized grain trade in Russia," p. 110.

[b] The Railroad Gazette, December 14, 1906, p. 528.

such a measure. But the difficulties were numerous, and in time the suggestions were limited to an optional system of grading, until it is now admitted that an obligatory system can not be introduced by the Government, but must grow with the development of the grain trade. Nevertheless the efforts made in 1890 are interesting as pointing out the difficulties met with.

As soon as the first elevators were constructed, some system of grading became necessary in each, in order to facilitate the handling of the grain, since an elevator could not work under a system in which it was necessary to preserve the identity of each separate lot.

A system of classification and grading was therefore elaborated by the committee in charge of the St. Petersburg elevator in 1890; and in the following year, after various changes were suggested, the Ministry of Finance submitted the plan, which embraced 12 varieties of wheat, each with many grades, to the grain-trading interests of the ports and internal markets.

The principal reasons for the complexity of the scheme proposed were the numerous varieties of wheat raised in Russia. An official publication [a] enumerates and describes more than 20 varieties.

In the classification of 1891 an effort was made to simplify matters by combining into groups the similar types. In the following list the translations of the Russian terms are given first; then in parenthesis are given the accepted equivalents in English, French, and German, as is done in the original text.[b]

Plan of wheat classification (1891):

A. Winter wheats.

1. White soft. (Mealy White Winter; blé à grain blanc tendre; hoch bunt-weisser Winterweizen, fein dantsig.)
2. White, glassy, flinty. (Glassy White Winter; blé à grain blanc, glacé; hochbunt-weisser Winterweizen, glasig.)
3. White motley; a mixture of white wheats Nos. 1 and 2, containing not less than 10 per cent of admixture of yellowish red grains. (White derived, variegated; bigarré blanc; hellbunt, gutbunt.)
4. Dark red. (Dark Red Winter; banata, rouge foncé; roth glasig.)
5. Light red. (Soft Red Winter; azima, rouge claire; mildroth.)
6. Yellow red. (Yellow Red Winter; jaune rouge; gelbrother Winterweizen, polisch Odessa.)
7. Red mixed; a mixture of red wheats Nos. 4 and 5, containing not less than 30 per cent of yellow and yellow-red grains. (Red derived, variegated; bigarré rouge claire, bigarré rouge foncé; rothbunter Winterweizen.)

B. Spring wheats.

8. Volga Russaks. (Red Spring, Petersburg Samarka and Saxonka; blés du Volga; rother Sommerweizen.)
9. Southern Kiskas, red and yellow. (Red Girka, Yellowish Girka; girka rouge et jaune rouge; girka roth und gelbroth.)

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[a] Industries of Russia, Vol. III, Agriculture and Forestry.

[b] Viestnik Finansov, 1891, No. 51.

B. Spring wheats—Continued.

10. Motley Russaks, Surka, and Siberian mixture of Nos. 8 and 9, containing more than 30 per cent of yellow seeds. (Red Spring, derived, variegated, Yellowish Spring; bigarré d'été, blé de Sibérie; bunter Sommerweizen.)
11. Hard spring wheats; bieloturka, arnautka, garnovka, Kubanka, chernouska, chernokoloska. (Hard Spring, Flint; blé dur, blé du Couban; Glasweizen, hartsamiger Weizen.)
12. Mixture of hard spring wheats containing large quantities of red and yellow-red seeds. (Hard Spring, derived; espéces dérivées précédentes No. 11.)

The scheme of grading recognized 12 principal varieties, differing from one another in color of grain (light red, dark red, white, motley); in hardness (grains either flinty or floury, soft); and in the shape of the kernel (roundish, plump, or elongated).

While the American system of grading was generally accepted as the example to be followed, it was criticized in Russia because it left too much to the individual judgment of the inspector. On account of the lack of experienced inspectors in Russia, and in order to safeguard the interests of the grain owner, the Ministry of Finance made an effort to apply a fixed rule to the grading of wheat. While the effort has not succeeded, the plan is interesting, nevertheless, as showing a possible solution of an important problem.

According to this scheme, there were 7 grades for each of the 12 varieties,[a] each grade based upon its natural weight, which was expressed in "funts per chetvert." In Table 4 these data are given in their original denominations, as well as reduced to United States denominations.

TABLE 4.—*Plan of grading Russian wheats, 1891.*

[Applies to all varieties.]

Grade.	Weight per—		
	Chetvert.		Winchester bushel.
	Funts.	*Pounds.*	*Pounds.*
000	396–a400	357. 52–361. 13	60. 1–a60. 6
00	390– 396	352. 10–357. 52	59. 1– 60. 0
0	384– 390	346. 68–352. 10	58. 2– 59. 1
I	378– 384	341. 27–346. 68	57. 3– 58. 2
II	372– 378	335. 85–341. 27	56. 4– 57. 3
III	366– 372	330. 43–335. 85	55. 5– 56. 4
IV	360– 366	325. 02–330. 43	54. 6– 55. 5

[a] And over.

NOTE.—Percentage of impurity: 1 per cent for grades 000, 00, and 0; 2 per cent for all other grades; of this, dust and sand no more than one-half of 1 per cent.

The universal introduction of this plan of grading was never accomplished, but, since the use of elevators was almost impossible without some such system of grading, the elevators built, or au-

[a] Similar plans of classification and grading were elaborated for the three cereals, but they are not given here.

thorized to be built, were given authority to form a working system of grading from year to year, subject, however, to the control of the central Government.

Though the rules of the various elevators, approved by the central Government, often vary in details, yet in their essentials they are fairly uniform. While the proprietors of elevators, whether a zemstvo or a railway, have the right to appoint their grain inspectors, yet these appointments must be confirmed by the department of commerce and manufactures (a branch of the Ministry of Finance, until the establishment of the Ministry of Commerce, to which the department was transferred). For the control of the grain inspectors, a local committee is usually appointed, consisting, in addition to the grain inspectors, of representatives of local grain exchanges, of city councils, and of railways when the elevators belong to the railways, the grain inspectors representing a small minority of the committee. This committee annually makes up the standard grades of cereals before the commercial movement begins, controls the activity of grain inspectors, and hears appeals from those dissatisfied with the grading. Samples of standard grades are required to be publicly exhibited.[a]

The great drawback to successful operation, however, remains; for, even when the local trade accepts the standard and grading established by the committee, the foreign trade refuses to do so, and no amount of Government compulsion within Russia can force a change in the attitude of the European buyer. Only the organization of Russian trade can force such a change and, while many efforts have been made in that direction, they have not proved successful.

Moreover, as only a small proportion of Russian grain passes through the elevators, the latter do not hold decisive power.

The slight advance that has been made may be shown by the fact that as late as December, 1906, a convention of the southern grain exporters in Taganrog again pointed out the necessity of standards as well as the difficulty of standardizing grain in different ports, because of the great differences and varieties, and the still greater difficulty of inducing foreign buyers to recognize the decision of the Russian trade.

GRAIN EXCHANGES.

STRONGER ORGANIZATION ADVISED.

It seems that appreciation of the comparative strength of the Russian and foreign dealers in the world market has had its effect upon the more recent plans for the reform of the grain trade. In 1902, when the question again came up for serious consideration, the Ministry of Finance did not think it sufficient to repeat the statement

[a] Vïestnik Finansov, Ukazatel, No. 33, 1895.

about the necessity for elevators; it strongly attacked the point of view which considers Government action sufficient and advocated mainly a stronger organization (which until recently existed on paper mainly) of the Russian grain bourses and an expansion of the trading in futures.

Through the instrumentality of these trade organizations the Ministry saw hope not only of improving the condition of grain, but also the conditions of Russia's foreign trade. But perhaps this hope in the trading in futures may prove as illusory as has the exaggerated faith in elevators, the real cause of the unsatisfactory conditions being the backwardness of Russian agriculture; for the real loser on account of the unorganized condition of the Russian grain trade is the producer, not the dealer.

EXPORT TRADE CONDITIONS.

METHODS OF TRANSACTION.

In the export trade in wheat, as well as in all other Russian grain, the commission business has become prominent. But here the foreign commission merchant usually represents the stronger party to the transaction, as the exporting firm is more powerful than the local dealer in the domestic trade, and, according to the statements of Russian grain dealers, the latter are considerably at a disadvantage in the trade.

Perhaps one of the main reasons for this state of affairs is to be found in the conditions of the Russian domestic grain trade, previously described. Russian grain not being standardized, the foreign buyer refuses to accept it before he has an opportunity of examining it. Trading is therefore done mostly by sample. Samples of the year's crop are sent soon after harvest to certain European markets and some standard of " fair average quality " is established for each commercial year.

After these standards are established, the actual trading is done either according to " fair average quality " (so-called trading f. a. q., the standard being either the season's crop or the season's shipments " at time and place of shipment ") or by sample.

But the deterioration in quality and condition of the wheat shipped, as well as the unreliability of some Russian exporters, of which more will be said in a later section, has gradually changed the f. a. q. form of trading to one of dealing according to individual samples.

All trading in Russian grain is done c. i. f. instead of f. o. b. The difference is much more than a formal one. The actual cost of insurance and freight may be presumed to be discounted in the prices, but there remain important differences as to conditions of delivery, which are carefully specified in the sale contract.

TRADE CONTRACTS.

In the conditions of trade contracts the Russian grain seller is sometimes said to be in a less favorable position than his American competitor, the difference being usually explained by the condition of the Russian grain exported, as has been described in the preceding section.

The standard forms of grain contracts used by practically all English grain importers are those of the London Corn Trade Association. These forms are also used by the grain buyers of eastern Germany, Denmark, Sweden, and Norway. Belgium has its own standard contract shaped by the Antwerp "Chambre Arbitrale et de Conciliation pour Grains," while in other Latin countries individual contracts are still largely used.

The quantity of the consignment and the port of shipment are specified in the contracts, but the port of delivery may, within stated limits, be left to the option of the buyer, and may be changed after clearing. The contracts of the London Corn Trade Association and of the Antwerp Chambre allow shipments from 2 to 5 per cent above or below the contract quantity and a further variation in quantity up to 8 per cent is permissible, provided that "any excess or deficiency over the above 2 to 5 per cent shall be settled at the c. f. and i. price in the bill of lading and on the quantity thereof, value to be fixed by arbitration, unless mutually agreed. Other contract forms than those of the two organizations mentioned above usually provide for a straight 5 per cent limit of variation in quantity, the buyer having a right to refuse to accept any other portion of the consignment than that contracted for when the difference is greater than 5 per cent.

The differences in the various trade contracts mentioned above are specially noticeable in the provisions referring to the quality of the grain. The three different ways of buying wheat may be described in the terms of the Corn Trade Association contract, as follows: (1) Of fair average quality of the season's shipment at time and place of shipment (the so-called f. a. q. transaction); (2) at time and place of shipment about as per sealed sample; and (3) official certificate of inspection to be final as to quality. This last condition, referring to inspection in the country of export, is the usual mode of purchasing grain from the United States, but is altogether absent from the Russian grain contracts, for many reasons, explained in the preceding section of this report. In the f. a. q. transactions complaints are frequently heard from Russian exporters that "a fair average quality of the season's shipment at time and place of shipment" is established by the Corn Trade Association in London without consultation with the Russian seller. All efforts

of organizations of exporters in Russian ports to establish their own f. a. q. standards are said to have failed, because of refusal of British and other European importers to accept them. In any case it is significant that in Russian dealings with British and north European buyers, f. a. q. transactions have been decreasing in frequency because of the vast differences frequently noticed between the f. a. q. standard and the quality of individual shipments. The usual form of transaction during recent years has been that known as " per sealed sample."

Another very important difference between the American and Russian grain contracts of the London Corn Trade Association is the provision for the guaranty of the natural weight. This provision is found in the Russian and also in the South American or so-called La Plata grain contract, but is absent in the American, excepting as implied in inspection certificates, and also in the Australian grain contract. This guaranty is also found in the transaction between Russian and most other European ports. In Russian shipments to northern European ports, natural weight is guaranteed at time and place agreed upon and the buyer assumes the risk of loss up to 1 per cent. The southern and European ports do not make this allowance.

Indemnification for loss of natural weight or for difference between the actual and guaranteed natural weight is regulated according to definite scales. In the trade with Russia the weight agreed is usually expressed in poods and funts per chetvert, or in kilograms per hectoliter, but according to the London scale 1 per cent is deducted from the price for the first 3 funts per chetvert; that is, one-third of 1 per cent for each funt (1 funt per chetvert=0.15 pound, or 2.42 ounces, per Winchester bushel). In Rotterdam and Antwerp the scale is 1 per cent of the price for the first kilogram per hectoliter (12.43 ounces per Winchester bushel) up to underweight of $2\frac{1}{2}$ kilos, and 2 per cent for each additional kilo up to 5 kilos per hectoliter, beyond which the difference in net weight is sufficient cause for arbitration. The reduction is larger in southern ports and a limit is established beyond which insufficiency in natural weight per bushel is sufficient cause for refusing a shipment.

ARBITRATION.

The usual method of settling all disagreements between buyers and sellers under the rules of the London Corn Trade Association is by arbitration. Delivery being effected only at the time of arrival at the foreign port, determination of quality is made at the time of delivery and not at the time of shipment. At the time and place of delivery both buyer and seller are represented by agents, who take

samples from the cargo for use in possible future arbitration. In case of disagreement, both sides may agree upon friendly arbitration, each electing an arbiter and the two electing a third. But in case of failure to agree, the questions in dispute are referred, according to the contract, to two arbitrators to be appointed officially by the executive committee of the London Corn Trade Association at a meeting convened by notice, and at which not less than three members shall be present, such two arbitrators having power to appoint a third. The arbitrators appointed are in all cases principals engaged in the corn trade as merchants, millers, factors, or brokers, and are also required to be members of the London Corn Exchange, the Baltic, or the London Corn Trade Association, and to reside in the United Kingdom.

Every award is required to be in writing on an official form to be supplied by the association at a charge fixed by them, and the award of any two arbitrators (subject, however, to the right of appeal) is conclusive and binding upon all disputing parties, both with respect to the matter in dispute and all expenses of and incidental to the reference and award.

In case either party shall be dissatisfied with the award, a right of appeal lies, under certain conditions, to the committee of appeal elected for that purpose. The committee of appeal is required to confirm the award appealed from, and the appeal fees follow the award, unless four members of the committee decide otherwise.

The former conditions of arbitration are the same for all transactions of the London Corn Trade Association; but in actual practice arbitration has played a more important rôle in the transactions with Russia than in those with the United States.

Among other differences between the Russian (or so-called Black Sea and Danubian) and the American contracts may be mentioned the following: That some of the Russian contracts include the s. d. clause, meaning "sea damaged, for seller's account." Another clause frequently found is the so-called r. t. (rye terms) clause, which does not permit appeal from the original decision of the arbitrators.

TRANSPORTATION.

RAILWAYS.

INCREASE OF MILEAGE.

Next to the emancipation of the serfs, the factor of greatest influence in the growth of the Russian grain trade has been the development of a railway system. Cheap transportation is a necessary condition to the development of a large grain trade. The first rail-

way in Russia was completed as early as 1838, but further development on a large scale became possible only after emancipation. Waterways were very important before the advent of modern railways, and Russia has several important streams which carry grain destined for export to the seaports; but the internal markets were largely dependent upon draft animals. It was estimated that in the forties 450,000 carts were required to deliver at Moscow about 9,000,000 poods (162,000 short tons) of the various cereals; that it took 14 days to make a round trip from Ryazan to Moscow, and that the cost ranged from one-half to three-fourths of a kopeck per pood per verst (0.6 to 0.9 cent per bushel per mile).[a]

The economic changes following emancipation stimulated railway construction. On the eve of emancipation the entire railway system of Russia did not aggregate 1,000 miles, but in the succeeding 10 years more than six times that mileage was built. (See Table 5.) Since then the growth of the railway system has been fairly rapid, and in 1904 the mileage in European Russia alone aggregated 32,000 miles.

TABLE 5.—*Development of the railway system in European Russia and in the United States.*[a]

Period of time.	Railways built during the period.		Railways open at the end of the period.		Railway mileage per 1,000 square miles of land.		Area per 1 mile of railway.	
	Russia.	United States.	Russia.	United States.	Russia.	United States.	Russia.	United States.
	Miles.	*Miles.*	*Miles.*	*Miles.*	*Miles.*	*Miles.*	*Sq. miles.*	*Sq. miles.*
1830–1840	17	2,818	17	2,818	0.01	0.95	123,001	1,054
1841–1845	0	1,815	17	4,633	.01	1.56	123,001	641
1846–1850	293	4,388	309	9,021	.15	3.04	6,767	329
1851–1855	339	9,353	649	18,374	.31	6.19	3,222	162
1856–1860	339	12,252	988	30,626	.47	10.31	2,116	97
1861–1865	1,376	4,459	2,364	35,085	1.13	11.81	885	85
1866–1870	4,329	17,837	6,693	52,922	3.20	17.82	312	56
1871–1875	5,048	18,174	11,742	74,096	5.62	24.95	178	40
1876–1880	2,325	19,171	14,066	93,267	6.73	31.40	149	32
1881–1885	1,865	35,053	15,932	128,320	7.62	43.20	131	23
1886–1890	2,119	38,383	18,050	166,703	8.63	56.12	116	18
1891–1895	3,842	14,412	21,892	181,115	10.47	60.98	96	16
1896–1900	6,337	13,147	28,229	194,262	13.50	65.40	74	15
1901–1904	4,073	18,087	32,302	212,349	15.45	71.49	65	14

[a] Compiled: United States, from Statistical Abstract of the United States, 1905; Russia, to 1880, from Annuaire Statistique de la Russie, 1890; 1880–1904, Statisticheskiĭ Sbornik Ministerstva Puteĭ Soobshchenia. 1881–1905. European Russia includes here Poland and Caucasia, but not Finland.

While the railway system of European Russia is more extensive than that of any other European country, yet in comparison with that of the United States, the development of the Russian railway system appears somewhat retarded. Notwithstanding its rapid growth, the Russian system was smaller in 1904 than the American

[a] "Development of the agricultural markets and grain trade in Russia before emancipation," by P. Liashchenko. Russian Economic Review, March, 1904. (In Russian.)

system in 1865; and now the American is almost seven times greater than the Russian. The average railway mileage per 1,000 square miles of land surface in Russia has increased from less than one-half mile in 1860 to 15.5 miles in 1904. The railway mileage in the United States was greater as early as 1870, and in 1904 it reached 71.5 miles per 1,000 miles of land surface. The difference between Russia and the United States in this respect may be quickly grasped if it is remembered that in 1865 there were in Russia for each mile of railway 2,000 square miles of surface; in 1870, over 300 square miles; in 1890, over 110 square miles, and in 1904, 65 square miles, while in the United States the relation was reduced to 56 square miles as early as 1870, and gradually fell to 14 square miles in 1904.

DISTRIBUTION OF RAILWAY FACILITIES.

Such general averages as the foregoing, however, are crude bases of comparison. The economic development of various regions of each of these two countries is very unequal, and, besides, both contain large areas which scarcely admit of economic development and are therefore poorly supplied with railroads, namely, the far north of Russia and the arid region of the United States. The distribution of railway mileage in Russia by principal economic regions is given in Table 6 for the years 1884 and 1904, the only years for which such data could be obtained.

TABLE 6.—*Transportation facilities in relation to the agricultural development of the various regions of European Russia.*[a]

Region.	Per cent of land cultivated.		Wheat area.		Per cent of cultivated land under wheat.		Railway mileage.	
	1884.	1904.	1884.	1904.	1884.	1904.	1884.	1904.
	Per cent.	*Per cent.*	*Acres.*	*Acres.*	*Per cent.*	*Per cent.*	*Miles.*	*Miles.*
Poland	(b)	47.7	922,018	1,241,992	(b)	8.3	1,409	1,934
New Russia	29.2	43.6	13,044,267	20,915,175	44.8	48.2	2,722	4,441
Little Russia	36.1	40.2	2,633,266	3,773,865	18.8	23.7	824	2,127
Central agricultural region	40.6	39.7	1,966,502	2,062,806	6.6	7.1	2,103	4,598
Southwestern region	28.7	37.4	2,675,343	3,208,958	21.1	21.1	962	2,322
Middle Volga	30.8	32.2	1,379,539	2,847,044	6.3	12.6	547	2,195
Lithuania	22.4	28.2	217,952	316,059	3.3	3.8	1,001	1,563
White Russia	15.3	19.7	135,069	173,118	1.5	1.5	1,276	2,237
Baltic region	14.8	18.2	91,020	132,609	2.7	3.2	500	1,219
Moscow industrial	16.8	15.6	168,132	97,789	1.4	.9	1,473	2,725
Lower Volga	8.5	12.4	5,187,301	9,949,326	43.0	56.6	383	1,327
Ural region	11.4	12.2	1,367,342	2,080,599	8.0	10.8	443	1,553
Lake region	5.9	6.1	16,549	25,159	.3	.5	791	1,456
Northern region	.5	.6	66,912	52,787	4.1	2.8	55	488
European Russia	15.3	18.1	29,865,813	46,877,286	16.0	21.2	14,489	30,185

[a] Computed from: Sbornik Svedenii po Evropeiskoi Rossii za 1882 god; Annuaire de la Russie, 1904 (Comité Central de Statistique); Urozhai 1904 goda (for areas under wheat); Bulletin No. 42, Bureau of Statistics, Department of Agriculture, Russia's Wheat Surplus; Statisticheskil Sbornik Ministerstva Putef Soobshchenia; Report on regular organization of the grain trade, Appendix 1903 (in Russian).

[b] No data.

TABLE 6.—*Transportation facilities in relation to the agricultural development of the various regions of European Russia*—Continued.

Region.	Railway mileage per 1,000 square miles of surface.		Navigable waterways.	Stone-bed roads.	Earth roads.	Per 1,000 square miles of surface.		
	1884.	1904.	1902.	1902.	1902.	Waterways.	Stone bed roads.	Earth roads.
	Miles.	*Miles.*	*Miles.*	*Miles.*	*Miles.*	*Miles.*	*Miles.*	*Miles.*
Poland	29	40	2,055	5,639	8,932	42	115	182
New Russia	17	29	3,616	[a] 675	[a] 14,615	23	[a] 7	[a] 158
Little Russia	14	36	1,037	396	7,083	17	7	117
Central agricultural region	18	40	1,966	1,076	11,432	17	9	99
Southwestern region	15	37	1,241	1,213	8,690	20	19	137
Middle Volga	5	20	2,886	343	6,735	26	3	61
Lithuania	21	34	1,015	1,169	11,046	22	25	237
White Russia	14	24	3,455	1,154	10,963	37	13	119
Baltic region	14	34	669	227	15,466	19	6	435
Moscow industrial	13	24	3,753	2,091	7,819	33	18	68
Lower Volga	2	6	1,809	26	9,467	8	.....	43
Ural region	2	7	6,288	346	8,161	27	1	35
Lake region	6	11	4,184	1,795	9,144	32	14	71
Northern region	0.1	1	5,029	.....	5,436	10	.....	11
European Russia	8	16	39,003	16,150	134,989	20	8	71

[a] Exclusive of Don Army Territory.

The same classification of regions of European Russia has been adopted here as in a previous study of wheat production in Russia.[a]

Arranging the principal regions according to the proportion of their surface cultivated in 1904, it is found that, in a rough way, railway density is greatest where agricultural activity is most intense, and, moreover, that, except in the lower Volga region, the wheat belt of Russia has been decidedly favored in railway construction. For entire European Russia there are 63 miles of land surface for each unit of railway. If the northern region is not included, the proportion drops to 50 square miles per mile of railway. In some provinces, as shown in Table 7, the density is still greater. Nevertheless, this is far behind the condition in the United States. In the North Central division, constituting the great American wheat belt, the area of land surface per mile of railway was 68 as early as 1860. In consecutive decades it dropped to 33, 17, and 10, until in 1900 it reached 9 square miles, and in 1904 it was 8 square miles.[b]

RAILWAY FACILITIES IN THE WHEAT REGION.

In an effort to compare somewhat more accurately the railway facilities available for the transportation of Russian and American wheat, the average railway density of all the wheat States of this country was weighted by the wheat area in 1890 and 1904 and the same calculation made for Russia by provinces, and it was found that the average area served by one unit of railway in the American wheat belt was 13.2 square miles in 1880 and 9.7 square miles in 1904; while in the Russian wheat belt it changed from 79 square miles per mile of railway in 1884 to 40 square miles in 1904.

[a] Bureau of Statistics Bul. No. 42, p. 19, note.

[b] Calculated from the data of Poor's Railroad Manual, in the Statistical Abstract of the United States, 1905, pp. 557–562.

TABLE 7.—*Transportation facilities in the wheat-growing provinces, 1904.*[a]

Province.	Per cent of land cultivated, under wheat.	Per cent of total area cultivated.	Railway mileage.	Navigable waterways.	Macadamized roads.	Earth roads.	Mileage per 1,000 square miles of surface.			
							Railways.	Waterways.	Macadamized roads.	Earth roads.
	Per cent.	*Per cent.*	*Miles.*	*Miles.*	*Miles.*	*Miles.*	*Miles.*	*Miles.*	*Miles.*	*Miles.*
Orenburg	61.6	11.5	326	237	3	1,502	5	3	.....	21
Astrakhan	57.6	2.1	94	677	2	3,186	1	7	.....	35
Samara	54.0	29.4	907	895	22	4,959	16	15	.....	85
Kherson	51.6	54.3	739	539	69	6,180	27	20	3	226
Ekaterinoslav	51.6	54.3	1,398	341	45	4,012	57	14	2	164
Taurida	49.2	48.6	488	103	503	3,270	21	4	22	140
Don Army Territory	49.0	30.5	1,286	1,555	(b)	(b)	20	24	(b)	(b)
Bessarabia	34.4	53.0	530	1,078	59	1,155	31	63	4	67
Poltava	32.7	47.3	698	253	126	1,514	36	13	7	79
Kharkov	31.8	42.8	765	168	89	3,794	36	8	4	180
Saratov	31.5	33.7	962	591	42	1,281	30	15	1	39
Podolia	29.1	48.9	789	289	414	2,951	49	18	26	182
Perm	23.1	7.1	855	2,481	.....	2,874	7	19	.....	23
Voronezh	21.4	40.9	812	502	108	2,081	32	20	4	82
Kiev	20.1	40.9	702	435	194	3,005	36	22	15	231
Volhynia	14.0	28.2	830	517	606	2,735	30	19	22	99
Ufa	12.2	7.5	409	2,033	231	2,649	9	14	5	56
Kursk	7.0	46.6	756	44	204	2,489	42	2	7	139
Wheat region of European Russia	37.1	25.1	13,346	12,738	2,717	49,637	18	17	4	68
Northern Caucasia:										
Kuban	59.6	29.4	565	230	(b)	(b)	15	6	(b)	(b)
Stavropol	58.3	33.0	127	.....	(b)	(b)	6	.....	(b)	(b)
Terek	29.5	8.6	302	.....	(b)	(b)	11	.....	(b)	(b)

[a] Compiled from same sources as Table 6. [b] No data.

Thus, notwithstanding material improvement in transportation facilities, the wheat region of Russia is not yet so well supplied as the United States, and, when 484 local committees were organized in Russia in 1902 to discuss the needs of Russian agriculture, no less than 82 new railways were projected or planned by these committees, and of these railways 45 were suggested for 15 provinces of the wheat belt, and only 37 for the remaining 35 provinces.[a] The difficulties connected with the insufficiency of railways, resulting in periodical congestion of grain shipments during the moving of crops, are especially felt in the wheat-growing south.

The closeness of the ties between Russian agriculture and the railways appears from statistics of freight movements, which show that grain and grain products constitute a much greater proportion of the freight on Russian roads than on American roads. In Table 8 the data are given for the last 20 years. The statistics of grain shipments do not include all the cereals shipped, but merely the five most important ones, namely, wheat, rye, oats, barley, and corn, and wheat and rye flour. As shown in that table, the total amount of freight carried is not very great and, while it has increased threefold in 20 years, it does not yet amount to more than one-eighth of

[a] Special council concerning the needs of rural industries. Digest of transactions of local committees of European Russia. "Railroads and Railroad Tariffs," by K. I. Gutzkevitch. Ch. IV. (In Russian.)

the freight carried on the railways of the United States, while the amount of grain and flour carried equaled about one-half that carried on American roads. Grain and flour constitute from 5 to 6 per cent of the American freight movement, but in Russia they constitute a very much greater proportion. Under the influence of the industrial development of Russia during the last 20 years, the proportion of grain to total freight has declined considerably, from 26.8 per cent in 1884–1888 to 17.1 per cent during the years 1899–1903. However, it should be pointed out that the low shipments of 1897–1901 were but temporary and partly due to short crops and to the competition of American grain; that since 1902 a strong reaction has taken place, and that the data for 1904 and 1905, when exports were particularly heavy, were not available. If they were available, they would probably show that a much greater share of the total freight consisted of cereal shipments; so that it may safely be said that at present one-fifth of the total freight consists of cereals and flour.

Furthermore, of the grain shipments, wheat and wheat flour are not only the most important, but their importance is growing; they constituted about 41 per cent of all the grain shipments in 1883–1887 and 46 per cent in 1899–1903. Of the total freight, wheat now constitutes normally from 5 to 6 per cent and wheat flour about 3 per cent; but because of the concentration of wheat shipments upon a few lines of railway and its general movement in one direction and within a short period of time, railway congestion affects wheat oftener than any other kind of freight.

TABLE 8.—*Wheat and wheat flour shipments on Russian railways, 1884–1903.*[a]

Year.	Total freight.	Grain and grain products.	Wheat.	Wheat flour.	Wheat and wheat flour.
	Short tons.	*Short tons.*	*Bushels.*	*Barrels.*	*Short tons.*
1884	26,268,400	6,728,300	62,233,800	7,162,700	2,569,000
1885	27,270,600	7,555,500	94,961,600	7,910,000	3,624,000
1886	26,143,900	6,193,500	49,235,600	7,247,800	2,187,400
1887	30,704,900	8,283,000	83,856,900	7,724,600	3,272,700
1888	34,803,700	10,128,000	124,511,500	8,346,300	4,553,300
1889	34,877,700	8,031,000	88,475,200	8,293,000	3,467,000
1890	35,524,200	7,655,200	88,906,700	8,665,000	3,516,400
1891	35,340,000	8,284,200	95,392,600	8,509,700	3,695,700
1892	35,069,100	6,755,800	67,783,700	8,943,600	2,910,000
1893	40,372,300	8,883,600	87,716,200	11,827,300	3,790,600
1894	47,105,500	11,396,000	100,360,500	13,403,200	4,324,300
1895	47,087,500	10,648,900	110,572,600	14,577,000	4,745,700
1896	50,913,600	10,315,400	115,913,700	14,951,400	4,942,700
1897	54,120,400	8,932,300	97,762,800	14,023,200	4,307,200
1898	60,481,700	10,635,400	113,526,000	15,136,200	4,889,100
1899	67,865,000	10,148,900	89,254,600	17,837,900	4,425,800
1900	71,357,100	11,282,400	95,326,400	20,228,300	4,842,200
1901	71,653,200	11,768,300	108,095,800	20,657,800	5,267,300
1902	74,042,100	14,156,200	139,199,200	22,608,100	6,391,600
1903	80,874,600	15,017,400	170,870,100	24,067,300	7,484,700
Average, 1884–1888	29,038,300	7,777,700	82,959,900	7,678,300	3,241,300
Average, 1889–1893	36,236,700	7,922,000	85,654,900	9,247,800	3,475,900
Average, 1894–1898	51,941,800	10,385,600	107,627,100	14,418,200	4,641,800
Average, 1899–1903	73,158,400	12,474,600	120,549,200	21,079,900	5,682,300

[a] Compiled from annual reports of Russian Ministry of Ways and Communications. The report of the Russian railway traffic for 1907 arrived too late for insertion in the table. In that year the total freight was 83,567,500 tons; grain and grain products constituted 15,376,500 tons or 18.4 per cent; wheat 176,182,300 bushels, and wheat flour 26,774,300 barrels; wheat and wheat-flour together 7,909,400 tons or 9.5 per cent.

TABLE 8.—*Wheat and wheat flour shipments on Russian railways, 1884–1903*—Continued.

Year.	Per cent of total freight.				Per cent of grain and grain products.		
	Grain and grain products.	Wheat.	Wheat flour.	Wheat and wheat flour.	Wheat.	Wheat flour.	Wheat and wheat flour.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
1884	25.6	7.1	2.7	9.8	27.8	10.4	38.2
1885	27.7	10.4	2.8	13.2	37.7	10.3	48.0
1886	23.7	5.6	2.7	8.3	23.8	11.5	35.3
1887	27.0	8.2	2.5	10.7	30.4	9.1	39.5
1888	29.4	10.6	2.4	13.0	36.9	8.0	44.9
1889	23.0	7.6	2.3	9.9	33.1	10.1	43.2
1890	21.6	7.5	2.4	9.9	34.8	11.1	45.9
1891	23.4	8.1	2.4	10.5	34.5	10.1	44.6
1892	19.3	5.8	2.5	8.3	30.1	13.0	43.1
1893	22.0	6.5	2.9	9.4	29.6	13.1	42.7
1894	24.2	6.4	2.8	9.2	26.4	11.5	37.9
1895	22.6	7.0	3.0	10.0	31.2	13.4	44.6
1896	20.3	6.8	2.9	9.7	33.7	14.2	47.9
1897	16.5	5.4	2.5	7.9	32.8	15.4	48.2
1898	17.6	5.6	2.5	8.1	32.0	14.0	46.0
1899	15.0	3.9	2.6	6.5	26.4	17.2	43.6
1900	15.8	4.0	2.8	6.8	25.3	17.6	42.9
1901	15.7	4.5	2.8	7.3	27.6	17.2	44.8
1902	19.1	5.6	3.0	8.6	29.5	15.7	45.2
1903	18.8	6.3	2.9	9.2	34.1	15.7	49.8
Average, 1884–1888	26.8	8.6	2.6	11.2	32.0	9.7	41.7
Average, 1889–1893	21.9	7.1	2.5	9.6	32.4	11.4	43.9
Average, 1894–1898	20.0	6.2	2.7	8.9	31.1	13.6	44.7
Average, 1899–1903	17.1	4.9	2.8	7.7	29.0	16.6	45.6

SLOW TRAIN MOVEMENT.

Besides the insufficiency of railway mileage as compared with that of the American wheat belt, another factor contributing to the congestion of freight is found in the poor service, against which many complaints are heard from Russian landowners. Railway speed is low. For passenger trains 20 miles per hour is considered fair speed, while for freight trains the actual speed averages from 6 to 12 miles per hour. Statements are often made that freight actually advances only 15 to 25 miles per day.

INSUFFICIENT ROLLING STOCK.

The rolling stock is quite insufficient. Usually the lack of it appears as the proximate cause of congestion of grain traffic, and, since this has come to be the situation each autumn, this insufficiency is evidently not an accidental feature of the Russian railway situation. The total number of freight cars on Russian railways in 1903 was 353,584 on 36,490 miles of railway, or 969 freight cars per 100 miles of railway. For European Russia the proportion was a little higher, namely, 326,685 cars on 31,344 miles, or about 1,042 cars per 100 miles. Upon American railways the relative number of cars is still smaller, being in 1904 only 797 per 100 miles, so a car shortage frequently becomes a problem in the United States as well. But in comparing the conditions in both countries it must be re-

membered that the average capacity of a railway car in European Russia in 1903 was only 26,765 pounds, while on American roads ony 2.8 per cent of the freight cars in 1904 had a capacity of 30,000 pounds or less, 73.5 per cent had a capacity of 40,000 to 60,000 pounds, and 23.5 per cent had a capacity of from 70,000 to 120,000 pounds, the average capacity being 60,000 pounds, or considerably more than double the capacity of the Russian car; so that in reality there were on American railways 237 tons of carrying capacity per mile of railway and only 139 tons on Russian railways, or only 59 per cent of the American carrying capacity.

At the same time, while the total quantity of freight carried on the railways of European Russia was much smaller than in the United States, the average tonnage per mile in the United States was 3,000 tons and in European Russia 2,580 tons, or only 14 per cent less. Moreover, this difference is partly compensated by the fact that the average haul of frieght on Russian railways was somewhat greater—290 miles as against 274 miles—so that, with a little more than half the hauling facilities, the service of a Russian railway mile was 754,457 ton-miles, as against 829,476 ton-miles in the United States, or only 9 per cent less. In other words, for every 1,000,000 ton-miles the American railway had 291 tons of car capacity and the Russian railway only 184.

These figures indicate for Russia a less favorable proportion between the rolling stock and the transport service to be performed, and as a consequence the Russian rolling stock has to perform a greater service. While the average American car, with its capacity of 60,000 pounds, performs service equivalent to 103,134 ton-miles, the service of the Russian car, with its capacity of only 26,765 pounds, is equivalent to 71,946 ton-miles. Reduced to 1 ton of car capacity this shows a service of 3,438 ton-miles per ton in the United States and 5,376 ton-miles in Russia.

This more intensive utilization of the rolling stock would serve as evidence of higher efficiency of the Russian railroads were it not for the periodical recurrence of alarming freight congestion, which indicates that this intensive work of rolling stock is obtained at a cost of very serious disturbance to the entire Russian grain trade.

RAILWAY RATES ON GRAIN.

MADE BY THE GOVERNMENT.

It is hardly necessary to emphasize the important influence of railway rates on the cost of marketing grain, and therefore upon the whole grain trade. Furthermore, the study of the Russian railway rate on grain is doubly interesting in view of the vast differences between American and Russian railway rates.

The rates on Russian railways are dictated by the Government. The larger proportion of the Russian railways belongs, at present, to the Government, which has been buying out the private railways at a rapid rate. In 1880 the Government railways constituted 43 miles out of a total of 13,614 miles, or 0.32 per cent, and in 1903, 24,307 miles out of a total of 36,490 miles, or 66.61 per cent. (See Table 9.) But as far as rates are concerned there is no difference between State and private railways.

HISTORY OF RATE REGULATION.

This condition is of comparatively recent origin. Until 1889 railway rates were almost free of any government regulation or supervision. The railways were owned by numerous small corporations which were free to change rates from day to day, and to compete with one another. Complaints about rates were frequent and the principal ones were directed against their complexity and instability, the sudden changes, the lack of publicity, and personal and local discrimination. As grain and milling products constituted at that time the greatest freight item on Russian railways, complaints were loudest from estate owners and grain dealers, especially as the world's agricultural crisis of the eighties considerably depressed prices and made the question of railway rates of much greater importance than formerly to the producer. Through rates on Russian railways were not frequent and many local railways charged the full rate of one twenty-fourth kopeck per pood-verst (about one-nineteenth of a cent per bushel-mile, or one-eleventh cent per 100 pounds and mile), which was the maximum permitted by law.

TABLE 9.—*State and private railways.*[a]

Year.	State railways.				Private railways.		All railways.
	European Russia.	Asiatic Russia.	Total.	Per cent of all.			
	Miles.	*Miles.*	*Miles.*	*Per cent.*	*Miles.*	*Per cent.*	*Miles.*
1880	43	.....	43	0.32	13,571	99.68	13,614
1885	1,942	144	2,086	12.98	13,990	87.02	16,076
1890	5,306	890	6,196	32.71	12,744	67.29	18,940
1895	13,539	890	14,429	62.98	8,480	37.02	22,909
1900	17,700	4,707	22,407	68.03	10,529	31.97	32,936
1903	19,161	5,146	24,307	66.61	12,183	33.39	36,490

[a] Compiled from "Statisticheskĭ Sbornik Ministerstva Puteĭ Soobshchenia," Vols. 5–81.

The necessity of regulating the rates on grain finally led to a complete change in the attitude of the State toward railway rates. A rate war between the southern and northern railways, based upon efforts to attract grain shipments to the southern or to the Baltic ports, which began in 1884 and by 1887 embraced pretty nearly all

of the important railways of Russia, forced the question of rate regulation, and especially that of grain rates, upon the attention of the Government. As the State railways suffered in the competition, further reductions of rates were prohibited by the Minister of Ways and Communications in 1887. On demand of the Government, a congress of railway representatives in 1888 elaborated a new scheme of rates on grain for export, which recommended an increase of rates along almost all lines. A law was then promulgated (March 8 [20], 1889), transferring the entire power of rate making to the Ministry of Finance. In accordance with this law, rates of transportation on grain and grain products have been elaborated five times—in 1889, 1893, 1897, 1901, and 1906.

The system of rates on grain adopted in 1901 is in force today; the changes of 1906 affected only milling products.

The principal objects to be realized in the elaboration of railway rates were simplicity, stability, publicity of rates, and the abolition of all kinds of discrimination. In addition, the agricultural interests demanded a general cheapening of cost of transporting grain, while the railway representatives sought to increase the income of the railways, as the State was rapidly becoming the greatest owner of railways in Russia. In order to grant a hearing to all interests involved, conferences of State railway officials with the representatives of all the various interests usually preceded the adoption of new rate schemes, but the final conclusion depended upon the tariff committee of the Ministry of Finance.

THE ZONE SYSTEM.

In the revision of the railway rates in 1889, the first general formula was elaborated, which was to apply to all railways and distances. In 1889 the formula constructed had only the force of a maximum rate to be applied in the absence of lower specific rates, of which about 1,000 had been established. The system was extremely simple in comparison with the preceding confusion. As the subsequent Russian railway rate systems were all based upon similar simple formulas, their general nature should be thoroughly understood. The rate systems are constructed upon a mileage basis; that is, the charge is a definite one per unit of weight and distance (per pood and verst), but the mileage principle is modified by the principle of differential rates; for, while there must be a strict compliance with what is known in this country as the long and short haul clause—that is, while the rate for the longer distance must not be less than that for the shorter distance—nevertheless, the mileage charge must be smaller the greater the distance of the haul.

This result is obtained by means of the zone or belt system, which may best be explained by an analysis of the formula of 1889. The old mileage rate of one twenty-fourth kopeck per pood and verst was left in force for distances not greater than 200 versts, so that for the entire distance of this first belt the rate was $8\frac{1}{3}$ kopecks per pood. When the distance was greater than 200 versts, but less than 360 versts, the old mileage rate of one twenty-fourth kopeck still serve as the basis of calculation, but was discounted one-tenth, so that for the entire distance of 360 versts, or the first zone, the rate was 15 kopecks minus 1.5 kopecks, or 13.5 kopecks per pood. The second belt extended from 360 versts to 1,600 versts, and within this belt the per verst rate was much lower, only one-eightieth kopeck, which was added to the 13.5 kopecks. For this entire belt the charge was 15.5 kopecks per verst and for the entire 1,600 versts the charge amounted to 29 kopecks. Finally, for distances greater than 1,600 versts, the per verst charge was only one two-hundredth kopeck in addition to the 29 kopecks per pood. At this last rate of one two-hundredths kopeck, the rate continued to increase to 3,000 versts, so that the entire charge was 36 kopecks per pood. According to the formula of 1889, all distances above 3,000 versts were considered as equal to 3,000 versts; that is, no additional charge was made for additional distances. This proviso, however, was of no practical importance for the entire grain trade in general and wheat in particular, very little if any wheat being shipped such long distances over Russian railways.

In Table 10 this formula of 1889 is presented in tabular form, both in original Russian units and in United States equivalents; that is, in cents per mile, both per bushel and per 100 pounds. The same table also contains the formulas for 1893, 1897, and 1901.[a]

[a] In converting the rates from Russian to American money units, the present equivalent of $0.515 for a ruble was used, though the actual value of the paper ruble varied considerably before 1897. No other conversion would have been possible and, if possible, would obscure the changes from one formula to another.

TABLE 10.—*General railway freight-rate formulas for grain, 1889–1901.*[a]

Year and zone distance in versts.	Charge— Per verst within zone.	Charge— For preceding zone.	Distance of zone in English miles.[b]	Charge per 100 pounds.[c] Per mile within zone.	Charge per 100 pounds.[c] For preceding zones.	Charge per bushel of wheat.[c] Per mile within zone.	Charge per bushel of wheat.[c] For preceding zones.
1889.[d]	*Kopecks per pood.*	*Kopecks per pood.*	*Miles.*	*Cents.*	*Cents.*	*Cents.*	*Cents.*
1 to 360	[e] $\frac{1}{24}$	.....	1.00– 238.64	0.08964	.....	0.05378	.....
361 to 1,600	$\frac{1}{80}$	13.50	238.64–1,060.64	.02689	19.252	.01613	11.551
1,601 to 3,000	$\frac{1}{200}$	29.00	1,060.64–1,988.70	.01076	41.357	.00645	24.814
3,001 and over[f]	.....	36.00	1,988.70 and over.	.....	51.339	.....	30.803
1893.							
Export trade.	*Kopecks per carload of 610 poods.*	*Rubles per carload of 610 poods.*					
1 to 180	25	.....	1.00– 119.32	.08817	.....	.05290	.....
181 to 980	9	45.00	119.32– 649.64	.03174	10.520	.01904	6.312
981 and over	5	117.00	649.64 and over.	.01763	27.353	.01058	16.412
Internal trade.							
1 to 320	18	.....	1.00– 212.13	.06348	.....	.03809	.....
321 to 980	9	57.60	212.13– 649.64	.03174	13.466	.01904	8.080
981 and over	5	117.00	649.64 and over.	.01763	27.353	.01058	16.412
1897.							
Export trade.	*Kopecks per carload of 750 poods.*	*Rubles per carload of 750 poods.*					
1 to 180	30	.....	1.00– 119.32	.08605	.....	.05163	.....
181 to 320	12	54.00	119.32– 212.13	.03442	10.268	.02065	6.161
321 to 800	11	70.80	212.13– 530.32	.03155	13.462	.01893	8.077
801 to 1,120	9	123.60	530.32– 742.45	.02582	23.502	.01549	14.101
1,121 and over	$6\frac{1}{2}$	152.40	742.45 and over.	.01864	28.978	.01119	17.387
Internal trade.							
1 to 200	22	.....	1.00– 132.58	.06310	.....	.03786	.....
201 to 540	15	44.00	132.58– 357.97	.04303	8.366	.02582	5.020
541 to 800	11	95.00	357.97– 530.32	.03155	18.064	.01893	10.838
801 to 1,120	9	123.60	530.32– 742.45	.02582	23.502	.01549	14.101
1,121 and over	$6\frac{1}{2}$	152.40	742.45 and over.	.01864	28.978	.01119	17.387
1901.							
Export trade.	*Kopecks per pood.*	*Kopecks per pood.*					
1 to 180	$\frac{1}{25}$	.....	1.00– 119.32	.08605	.....	.05163	.....
181 to 344	$\frac{1}{63}$	7.20	119.32– 228.04	.03415	10.268	.02049	6.161
345 to 800	$\frac{1}{68}$	9.80	228.04– 530.32	.03164	13.976	.01898	8.385
801 to 1,120	$\frac{1}{84}$	16.50	530.32– 742.45	.02561	23.530	.01537	14.118
1,121 to 2,779	$\frac{1}{115}$	20.31	742.45–1,842.20	.01871	28.964	.01122	17.378
2,780 and over[g]	$\frac{1}{80}$	.....	1,842.20 and over.	.02689	.....	.01613	.....
Internal trade.							
1 to 200	$\frac{1}{34}$	.....	1.00– 132.58	.06327	.....	.03796	.....
201 to 540	$\frac{1}{50}$	5.88	132.58– 357.97	.04303	8.385	.02582	5.031
541 to 800	$\frac{1}{68}$	12.68	357.97– 530.32	.03164	18.083	.01898	10.850
801 to 1,120	$\frac{1}{84}$	16.50	530.32– 742.45	.02561	23.530	.01537	14.118
1,121 to 2,779	$\frac{1}{115}$	20.31	742.45–1,842.20	.01871	28.964	.01122	17.378
2,780 and over[g]	$\frac{1}{80}$	.....	1,842.20 and over.	.02689	.....	.01613	.....

[a] Compiled from: (1) Materials presented to the special council in regard to the needs of agricultural industry, pp. 131–154. (In Russian.) (2) Digest of transactions of local committees on the needs of agricultural industry, volume on "Railways and Railway Tariffs," by K. I. Gutzkevitch, St. Petersburg, 1904, p. 261. (In Russian.)

[b] In converting the distances, the limiting distance of one zone was taken as the beginning of the other; thus, 181–360 versts was converted as if it read 180–360. This was done to underscore the continuity, as otherwise it would appear that the first zone ended at 119.32, while the second zone began at 119.98. In actual calculations the distance is stated in entire versts.

[c] In converting the Russian rubles and kopecks into United States values, the present equivalent of 51.5 cents was used. See text for explanation.

[d] Maximum rate; actual rates lower in the majority of cases, and export rates lower than internal rates.

[e] A 10 per cent reduction allowed for distances over 200 versts (132.54 miles), which reduces the rate on 360 versts (238.64 miles) from 15 kopecks to 13.5 kopecks per pood.

[f] Distances over 3,000 versts entirely disregarded in calculating rate.

[g] A flat per verst rate of one-eightieth kopeck for the entire distance, when it is 2,780 versts or larger.

While these formulas are sufficient for calculation of the rate for any given distance with very little labor, they are somewhat too complicated to convey this information at first glance. Calculations are therefore made in Table 11 of the rates per 100 pounds, according to all four formulas, for certain distances, namely, for every 50 miles up to 1,000 miles, and for every 100 miles after that up to 2,000 miles. With the aid of this table a comparison between the Russian and the American rate for definite distances can easily be made. It also shows the changes which have taken place in the Russian rates within the last decade or so. The differences between the formulas as stated in Table 10 appear much greater than they really are because of the different units used; i. e., the pood in 1889 and 1901, the carload of 610 poods in 1893, and the carload of 750 poods in 1897.

In contemplating these changes it must be remembered that the formula of 1889 was only a maximum formula, to be applied in the absence of a specific rate. This combination of a strict-rate system with numerous specific rates did not prove satisfactory. The problem of changes in specific rates remained, and under pressure the tendency for these rates to increase rapidly soon manifested itself. As the formula of 1889 was established for three years only, a reconsideration of the entire matter led, in 1893, to the establishment of a universal formula, or rather of two formulas, one for the export and the other for the internal trade. The exceptions to this formula were comparatively few and of no great importance.

TABLE 11.—*Calculation of railway rates on grain for definite distances per 100 pounds, 1889–1901.*[a]

Distance in miles.	1889.	1893.		1897.		1901.		Change from 1893 to 1901.		Less than carload rate, 1901.
	Maximum rate.	Export rate.	Internal trade rate.	Export rate.	Internal trade rate.	Export rate.	Internal trade rate.	Export rate.	Internal trade rate.	
	Cents.	*Cents.*	*Cents.*	*Cents.*	*Cents.*	*Cents.*	*Cents.*	*Cents.*	*Cents.*	*Cents.*
50	4.48	4.41	3.17	4.30	3.16	4.30	3.16	−.11	−.01	4.48
100	8.96	8.82	6.35	8.60	6.31	8.60	6.33	−.22	−.02	8.96
150	12.10	11.49	9.52	11.32	9.12	11.32	9.14	−.17	−.38	12.10
200	16.14	13.08	12.70	13.04	11.27	13.03	11.29	−.05	−1.41	16.13
250	19.54	14.67	14.67	14.66	13.42	14.67	13.44	0.00	−1.23	20.17
300	20.90	16.26		16.23	15.57	16.26	15.59	0.00	−.67	24.20
350	22.25	17.84		17.81	17.72	17.84	17.75	0.00	−.09	26.67
400	23.59	19.43		19.39	19.39	19.42	19.42	−.01	−.01	30.48
450	24.94	21.02		20.97		21.00		−.02		34.28
500	26.28	22.60		22.54		22.58		−.02		38.10
550	27.62	24.19		24.01		24.04		−.15		41.90
600	28.97	25.78		25.30		25.32		−.46		45.71
650	30.31	27.36		26.59		26.59		−.77		49.52
700	31.66	28.24		27.88		27.88		−.36		50.18
750	33.00	29.12		29.12		29.10		−.02		53.78
800	34.35	30.00		30.05		30.04		+.04		57.36
850	35.69	30.88		30.98		30.97		+.09		60.94
900	37.04	31.77		31.92		31.91		+.14		64.53
950	38.38	32.65		32.85		32.84		+.19		68.11
1,000	39.72	33.53		33.78		33.78		+.25		67.22
1,100	41.78	35.29		35.64		35.65		+.36		73.94
1,200	42.86	37.06		37.51		37.52		+.46		80.66
1,300	43.93	38.82		39.27		39.39		+.57		87.39
1,400	45.01	40.58		41.24		41.26		+.68		87.83
1,500	46.08	42.34		43.10		43.03		+.69		94.11
1,600	47.16	44.11		44.96		45.00		+.89		100.38
1,700	48.24	45.87		46.83		46.87		+1.00		100.66
1,800	49.31	47.63		48.79		48.75		+1.12		112.94
1,900	50.39	49.40		50.56		51.09		+1.69		119.21
2,000	51.34	51.16		52.42		53.78		+2.62		125.48

[a] Computed from the formulas as given in Table 10.

THE FORMULA OF 1893.

While apparently the rate changes of 1893 were few, yet in substance they were considerable and important. The zone formulas look so simple that they do not exhibit all the many factors which enter into consideration in shaping the final form.

The principal feature of the formula of 1889 is the differential principle; that is, the rapid decrease of the per verst rate with the increase of distance, due to an effort to stimulate shipments from long distances—from the border lands of the East. The effect of this measure upon the agricultural interests of the central provinces was so depressing that in the formula of 1893 this "differential action" was greatly reduced. In the last zone, which begins much lower in the scale than in the 1889 formula (at the nine hundred and eightieth verst instead of at the one thousand six hundredth), the per verst rate is much higher, and the proviso of the formula of 1889, by virtue of which additional distances of over 3,000 versts are disregarded, was abolished, as it might have helped to flood the internal Russian market with Siberian grain. Another important modification first introduced in 1893 was different formulas for the export and internal trade. While there was only one formula for both in 1889, yet the rates actually charged on export trade for distances less than 400 versts were higher and for distances greater than 400 versts lower by about 10 per cent than the rates on internal trade.

These special concessions to the agriculture of distant regions occasioned dissatisfaction in the central provinces, hence the differences between export and domestic shipments according to the formula of 1893 and the two subsequent formulas consist only in lower rates to the domestic markets for shorter distances.

According to the formula of 1893 grain shipped short distances to internal markets had a preferential advantage of 7 kopecks per carload and verst, or about 28 per cent. This reduction rapidly declined at distances greater than 180 versts, until it vanished altogether at 320 versts.

This gave a considerable advantage to the grain of the central provinces in the main domestic markets, and thus the grain from longer distances was directed to export channels.

The special reduced export rates for longer distances were abolished, as it was asserted that grain brought to the port at such reduced rates from long distances was often reshipped to one of the large internal markets lying near the frontier.

REVISION OF FORMULA IN 1897.

The railway-rate formula of 1893 did not satisfy all agricultural elements. The loudest complaints continued to come from the central provinces, which claimed that they still had to suffer the competition

of grain from distant regions in the large internal markets as well as in the export trade. The general fall of prices in the world market caused a demand for a reduction of railway rates all along the line, as well as for a special lower export rate for longer distances. In 1895 a national congress of estate owners, held in Moscow, requested a general reduction of all grain rates to one one-hundredth kopeck per verst and pood, but this petition was denied.[a] The increasing gravity of the situation in the central provinces made some concession necessary, but of the two concessions proposed, increased rates for longer distances or lower rates for shorter distances, the latter was adopted.

In the rate formula of 1893 the internal trade rates were lower than the export rates up to 320 versts, but in the formula adopted in 1897 such difference extended up to 540 versts. In addition the rates were lowered somewhat, both in the domestic and in the export trade, for distances from 800 to 1,120 versts, which reduced the charges for shipping wheat from the central provinces to the Baltic ports and to the markets of the Polish provinces.

As a result of the railway rate revision, the principle of one simple and differential formula, instead of local rates, was left intact, but the differential in favor of outlying districts was somewhat weakened by reducing the charges on shorter distances. The export rates were left substantially as before, the Ministry of Finance maintaining that their further reduction would not only be of no assistance to the agricultural population, but that reduction would simply accrue to the profit of the foreign purchaser. In view of the world-wide production of cereals such reduction would help increase the shipments and thus further depress prices.

THE PRESENT RATES.

Finally, in 1901, the formula was revised anew, but with very slight modification, the points where the rates on internal and export trade coincide being left at 540 versts as before. A pood instead of a carload was taken as a basis for the formula, and a few slight changes were introduced to make calculations easier, as for instance, shifting the end of the second zone from 320 to 344 versts. Perhaps the most important formula change was in limiting the fifth zone (in which the per verst charge was 6½ kopecks per carload of 750 poods, or about one one-hundred and fifteenth kopeck per pood) to 2,779 versts, and charging for all distances over 2,780 versts a flat per verst rate of one-eightieth kopeck for the entire distance; but this provision had little significance for the wheat trade, especially for the export branch of it, since almost no wheat is shipped on railroads such long distances.

[a] Vïestnik Finansov, p. 70, No. 15, April 14 (26), 1896.

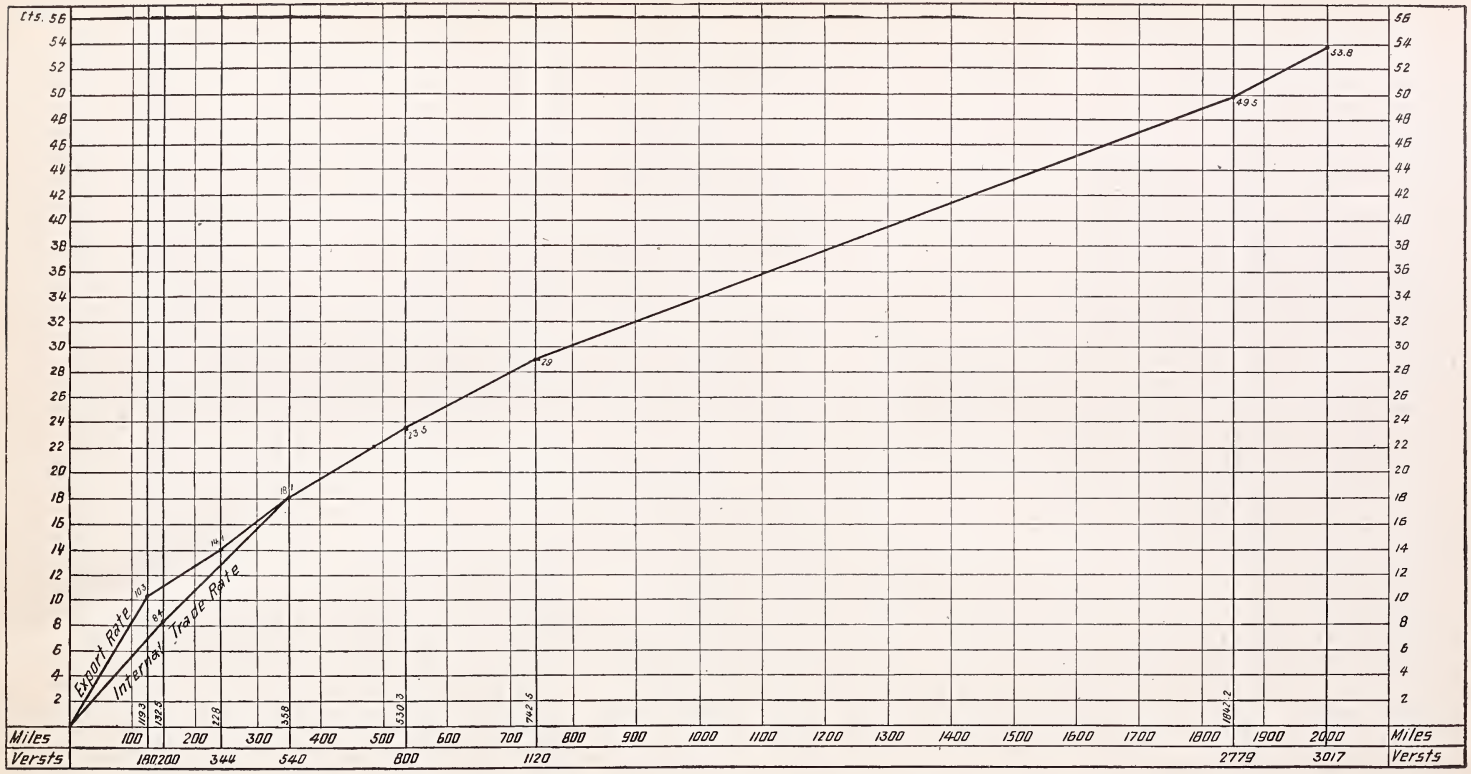
In Plate I an effort is made to give a graphic representation of the Russian railway grain freight formula in force since 1900. The distances have been platted horizontally, while the cents are platted vertically, the heavy line representing the rates and its distance from the base line indicating the specific rate for any number of miles.

The formulas, as stated, apply to all kinds of grain when expressed by weight as they are in the Russian formulas. This remains true in the conversion of Russian data in kopecks per pood and verst to cents per 100 pounds and mile. In the last columns the rate is calculated for bushels of wheat and the bushels of different grains having a different weight. This would give a different rate per bushel for different grains, but this must not obscure the fact that the actual rates are equal. Many efforts have been made by the landowners of the central provinces, where comparatively very little wheat is grown, to obtain a lower rate on the so-called "gray" grains, namely, rye and oats; but these demands were refused by the Government on the ground that such difference in rates would unnecessarily stimulate the cultivation of the cheaper cereals. As was shown in Bulletin No. 42, the history of Russian agriculture for the last 25 years is the history of a continuous increase in the growth of wheat at the expense of rye, and it is not unreasonable to suppose that this railway-rate policy has been one of the causes of this tendency.

RATES FOR LONG DISTANCES.

One of the important changes in rates concerned long distances. In computing the rate, the original formula of 1889 considered all distances over 3,000 versts as equal to 3,000 versts. As work on the Siberian railway progressed, this provision in the formula aroused the apprehension of the central provinces lest Siberian grain, principally wheat, overflow the markets of Russia. To quiet these fears, the provision of the formula of 1889, above mentioned, was abolished in the formula of 1893, and the additional per verst rate of 5 kopecks per carload of 610 poods was charged for the entire distance over 960 versts. Even this did not prove satisfactory to the landowners of the central provinces, and in 1896, when grain shipments over the Siberian railway began to materialize, a special order of the Minister of Finance modified the formula for Siberian grain by making Cheliabinsk, the point of connection of the Siberian railway with the railway system of European Russia, a breaking point for the formula. This means that for grain passing from Siberia to Europe the rate must be calculated separately from starting point to Cheliabinsk and from Cheliabinsk to point of destination. This deprived Siberian agriculture of a considerable

PLATE I.



RUSSIAN RAILWAY FORMULA FOR TRANSPORTATION OF GRAIN (CENTS PER ONE HUNDRED POUNDS).

Bul. 65, Bureau of Statistics, U. S. Dept. of Agriculture.

part of the differential granted to long distances and raised the freight rate on Siberian grain about 8 or 10 kopecks per pood.[a] This provision was embodied in the rate law of 1897 and preserved in the law of 1901.

On the other hand it was decided to assist the exportation of Siberian wheat if certain that it would not come into competition with grain from the central provinces. With this in view, the rate on Siberian grain was reduced when shipped through Viatka to Kotlass, at the point of confluence of the Vychegda and the northern Dvina, whence it goes down the latter river to Archangel. The rate to Archangel is about 4 kopecks less than to St. Petersburg. This undoubtedly explains the appearance of exports of wheat from Archangel, which is so far from the European wheat belt. Small shipments of oats were made from Archangel for many years, but the exportation of wheat began in 1898, a small quantity, about 6,000 bushels, constituting the initial shipment. In 1899 the quantity rose to 114,000 bushels; in 1900, to 1,250,000 bushels, and in 1904, to 2,835,000 bushels, in addition to about 10,000 tons of grain products.

CHANGES IN RAILWAY RATES.

The comparison of actual rates for definite distances, computed according to the four various formulas (Table 11), shows that there has been no general tendency toward lowering grain rates on Russian railways since 1889. A comparison between the present rates and those of the formula of 1889 would be misleading, since the first formula was a maximum formula and the average charge was considerably lower. It is officially stated that the lowering of all grain rates in comparison with the rates of 1888, as established by the congress of railroad officials, was equivalent to a reduction of railway income by 1,683,000 rubles, if calculated on the basis of the shipments of 1889, of which 1,104,000 rubles fell on the export trade. On the other hand the rates of 1888 were considerably higher than those during the preceding decade. No serious reduction of rates has taken place since that year.

The greatest reductions were made in the internal trade for short and medium distances, the reduction increasing up to the distance of 200 to 250 miles, and then decreasing until it vanishes at 400 miles, then again increasing for 600 to 700 miles; but from 800 miles on there is a tendency toward an increase of rates, which rapidly rises and amounts to 1 per cent at 1,000 miles, 2 per cent at 1,600 miles, and about 5 per cent at 2,000 miles. In the export trade the reduction of rates for short distances is very much

[a] Reports presented to the Special Council on the Needs of Rural Industries, p. 139. (In Russian.)

smaller, in fact quite insignificant. The appeals for lower rates, which increased during the period of depression of grain prices in the nineties, were always answered by the argument that any lowering of railway rates during a period of an overflowing market would revert to the consumer by facilitating increased shipments and would be of no benefit to the producer.

Since about 85 per cent of the Russian wheat area lies at short distances from the southern ports (70 per cent in the eight provinces of New Russia and the lower Volga region and 12½ per cent in Caucasia), the high rates for longer distances did not affect wheat as much as other grains. Nevertheless they become a factor in the situation if one considers the growing importance of the Siberian wheat supply.

SUPPLEMENTARY RAILWAY CHARGES.

The railway rate, as fixed by the formula, is not, however, the entire charge for the transportation of grain. Several additional charges are levied independent of distances. The amount of these charges is given in the following table:

TABLE 12.—*Items of charge supplementary to freight rate.*

Item.	Kopecks per pood.	Cents per 100 pounds.
Obligatory charges:		
Station charges	0.50	0.71
Loading	.22	.31
Unloading	.11	.16
Weighing	.20	.29
Special tax[a]	.20	.29
Total charges	1.23	1.76
Incidental charge for transfer at junction of roads of different gauge	.33	.47
In addition, when grain is shipped in bulk:		
For car doors, 75 kopecks per car	.10	.14
For unloading at the place of destination, and loading into the consignee's or the railway's warehouse or bags	.25	.36
For reloading from the railway warehouse into the consignee's bags	.25	.36

[a] To be used for constructing storage facilities for grain at the railway stations.

The obligatory charges, then, amount to at least 1.76 cents per 100 pounds when shipped in bags or 1.9 cents when shipped in bulk, which is equal, in round numbers, to 1.06 cents per bushel. As these additional charges are levied irrespective of distance, they impose a much heavier burden upon the shipments for short distances.

EXCEPTIONAL FREIGHT RATES.

While the formulas are now much more generally followed than they were 16 years ago, nevertheless they are not absolutely binding, and some exceptions are made when considered necessary. The breaking of the formula at Cheliabinsk has already been mentioned.

An important class of exceptions is represented by the so-called navigation tariffs—that is, lowered freight rates in force during the

navigation period—which enable the railroads to compete with the waterways. Most of these navigation tariffs are active in one direction—from east of the Volga to St. Petersburg—and are therefore of no great importance for the export wheat trade. For instance, the rate from Rybinsk to St. Petersburg, a distance of 575 versts (381 miles), is 11.72 kopecks per pood, or 16.7 cents per 100 pounds, instead of the regular rate of 18.8 cents; the rate from Nizhni-Novgorod (1,014 versts, or 672 miles) is 15 kopecks per pood, or 21.4 cents per 100 pounds, instead of the regular rate of 27.2 cents. The average reduction resulting from the navigation tariffs is about 20 per cent, but even with that reduction the freight rates are higher than in this country.

In addition, there are about 20 exceptional (reduced) tariffs, which for all grain and seed shipments contain about 950 special rates, but only a very few of these apply to wheat or wheat flour. The main reductions have been granted to the central agricultural and middle Volga provinces on shipments of grain to the northern Baltic ports—Riga, St. Petersburg, and Reval—for these grain-raising provinces are located most unfavorably in regard to both the Baltic and the southern ports, and railway concessions were granted in the hope of improving their condition. The reductions on these special tariffs seldom amount to more than 10 to 20 per cent from the regular rates, and it is only under exceptional circumstances that the Baltic ports, with their lower ocean rates to the foreign ports and these reduced railway rates, are able to overcome the natural tendency to export wheat through the near southern ports. From the point of view of the export wheat trade, the most important reductions are those over the branch of the Southwestern Railroad in Bessarabia. These reductions vary from 25 to 60 per cent, but are explained by the effort to counteract competition of the Roumanian railways, to which the grain of the Province of Bessarabia would naturally tend. It is, then, a measure undertaken mainly for considerations of railway policy, and not those of the grain trade, for Bessarabia is favorably located in respect to the markets, and would seem to have no special claims for reduced railway rates.

Finally, the Vladikavkas Railway has a special formula for its grain freight, which makes for somewhat higher rates at distances between 300 and 800 versts (200 to 530 miles).

Taken together, all these exceptions, while of great local importance, do not much affect the average cost of transportation of wheat, and are therefore of little significance for the export trade. It is worthy of mention that all these exceptions are more or less permanent; they have undergone practically no change since 1893, and thus the Russian grain trade is entirely free from serious rate fluctuations in cost of carrying grain to the exporting port.

WATERWAYS.

Insufficiency of railway facilities and high freight rates have helped to preserve the commercial importance of Russian waterways.

Before the advent of steam railways, Russia, like the United States, had to rely upon rivers and lakes for highways of commerce; but, unlike the United States, Russia still makes extensive use of her rivers, and the total quantity of freight carried on the waterways of European Russia grows as fast as the total freight carried on the railways. On most of the Russian rivers navigation is interrupted for a considerable part of the year by the severe winters; nevertheless the total freight carried (exclusive of lumber, timber, and wood carried on rafts) amounted to 9,000,000 tons in 1884 and to more than 26,000,000 tons in 1903, or to about one-third as much as the total carried on the railways; while, adding the weight of the rafts, the total quantity was almost one-half of the railway tonnage.

In the distribution of inland waterways European Russia has been favored by nature. Though its coast line is very limited, it is so distributed that the rivers rising in central Russia flow in different directions, and short canals or locks on rivers combine rivers into extensive waterway systems, such as the system of canals which unites the Caspian Sea in the southeast with the Baltic Sea in the northwest through the Volga and the system of lakes and rivers. In European Russia 24,649 miles of the rivers are open to navigation in both directions, 10,396 miles to towing of loaded barges down the river, and 18,122 miles to drifting timber rafts. The total length of the waterways is therefore 53,167 miles. Disregarding the mileage which permits only the drifting of timber rafts, the total is still 35,045 miles,[a] or more than the railway system; so that the rivers are very important in Russian trade, although annually closed to navigation 4 months in the south and 6 months in the north.

The distribution of the waterways throughout the large regions of European Russia is shown in Table 6. It does not exactly correspond with the agricultural development of the country, so that many large rivers are of slight importance in the grain trade. Nevertheless, as appears in Table 7, a few of the wheat provinces are well provided with navigable rivers, notably Kherson, the Don Army Territory, Bessarabia, and Kiev.

As shown in Table 13, the proportion of grain shipments to total freight on waterways is about the same as on the railways and has declined from about one-third of the total in the eighties to one-fifth in the early years of the present century.

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[a] From Report of Ministry of Ways and Communications. Another authority, quoted in Table 6, pp. 33 and 34, gives 39,003 miles instead of 35,045.

TABLE 13.—*Wheat and wheat-flour shipments on Russian waterways, 1884–1903.*

Year.	Total freight.	All grain and flour.	Wheat.	Wheat flour.	Wheat and wheat flour.
	Tons.	*Tons.*	*Bushels.*	*Barrels.*	*Tons.*
1884	8,951,736	2,323,082	35,092,012	1,051,509	1,155,808
1885	9,390,231	2,812,700	30,054,276	1,235,574	1,022,715
1886	9,827,503	2,986,077	26,054,783	1,299,140	908,959
1887	10,105,445	3,071,159	30,500,871	1,315,354	1,043,931
1888	10,319,233	2,888,048	29,164,697	1,668,375	1,038,442
1889	11,097,463	2,805,784	31,612,543	1,607,388	1,105,900
1890	10,884,398	2,545,989	29,434,340	1,543,638	1,034,307
1891	11,164,272	2,297,009	31,010,663	1,336,358	1,061,283
1892	10,168,353	1,684,265	22,414,613	1,419,270	811,527
1893	12,784,545	2,685,835	32,982,422	2,050,876	1,190,458
1894	15,656,398	4,084,412	42,683,524	2,716,936	1,546,765
1895	15,769,358	4,153,785	48,554,261	3,054,480	1,755,967
1896	16,190,416	4,080,042	48,063,729	3,151,026	1,750,712
1897	18,512,667	4,222,796	52,751,171	4,064,164	1,980,823
1898	19,546,180	4,319,652	49,930,761	3,374,520	1,828,626
1899	20,327,010	3,044,833	36,272,298	4,214,512	1,501,191
1900	21,868,431	4,082,101	39,143,868	4,024,182	1,568,686
1901	23,125,192	4,702,862	45,308,323	5,488,778	1,897,150
1902	24,424,278	4,133,218	40,539,627	5,832,218	1,787,746
1903	26,293,188	5,305,512	62,988,548	6,750,515	2,551,207
Average, 1884–1888	9,718,830	2,816,213	30,173,328	1,313,990	1,033,971
Average, 1889–1893	11,219,806	2,403,776	29,490,916	1,591,506	1,040,695
Average, 1894–1898	17,135,004	4,172,138	48,396,689	3,272,225	1,772,579
Average, 1899–1903	23,207,620	4,253,505	44,850,533	5,262,041	1,861,196

Year.	Per cent of total freight.				Per cent of all grain and flour.		
	All grain and flour.	Wheat.	Flour.	Wheat and flour.	Wheat.	Flour.	Wheat and flour
1884	26.0	11.8	1.2	13.0	45.3	4.4	49.7
1885	30.0	9.6	1.3	10.9	32.1	4.3	36.4
1886	30.4	8.0	1.3	9.3	26.2	4.3	30.5
1887	30.4	9.1	1.3	10.4	29.8	4.2	34.0
1888	28.0	8.5	1.6	10.1	30.3	5.7	36.0
1889	25.3	8.5	1.4	9.9	33.8	5.6	39.4
1890	23.4	8.1	1.4	9.5	34.7	5.9	40.6
1891	20.6	8.3	1.2	9.5	40.5	5.7	46.2
1892	16.6	6.6	1.4	8.0	39.9	8.3	48.2
1893	21.0	7.7	1.6	9.3	36.8	7.5	44.3
1894	26.1	8.2	1.7	9.9	31.4	6.5	37.9
1895	26.3	9.2	1.9	11.1	35.1	7.2	42.3
1896	25.2	8.9	1.9	10.8	35.3	7.6	42.9
1897	22.8	8.5	2.2	10.7	37.5	9.4	46.9
1898	22.1	7.7	1.7	9.4	34.7	7.7	42.4
1899	15.0	5.4	2.0	7.4	35.7	13.6	49.3
1900	18.7	5.4	1.8	7.2	28.8	9.7	38.5
1901	20.3	5.9	2.3	8.2	28.9	11.4	40.3
1902	16.9	4.0	2.3	6.3	29.4	13.8	43.2
1903	20.2	7.2	2.5	9.7	35.6	12.5	48.1
Average, 1884–1888	29.0	9.3	1.3	10.6	32.1	4.6	36.7
Average, 1889–1893	21.4	7.9	1.4	9.3	36.8	6.5	43.3
Average, 1894–1898	24.3	8.5	1.9	10.4	34.8	7.7	42.5
Average, 1899–1903	18.3	5.8	2.2	8.0	31.6	12.1	43.7

WHEAT SHIPMENTS ON WATERWAYS.

Because of the localization of the wheat crop, only a few Russian rivers are important in the wheat trade. On the Volga, the Dnieper, the Don, and the southern Boog are transported over 95 per cent of the total shipments of wheat by water. (See Table 24.) On the Volga and its tributaries the greatest quantity of wheat is transported, but, because of geographic position, its importance in the wheat export trade is comparatively slight. The Volga empties into the great inland Caspian Sea, which has no outlet to any important

foreign port. As a consequence, more than 90 per cent of the wheat shipped on the Volga goes up the river from the wheat-growing regions to the internal markets of the north and northwest, while on the other waterways mentioned in Table 24 practically all the wheat is shipped down stream to the southern ports.

In early years, when railway development was in its infancy, a considerable share of the Volga wheat entered foreign trade after reaching St. Petersburg, but, as shown in a subsequent section (p. 58), the importance of the Baltic ports in the wheat trade has considerably declined, and an increasing share of the Volga production of wheat is consumed in the industrial region of the center and the northwest. Still, this long route is open as a possible overflow outlet in cases of congestion on other routes, especially in years of a large surplus of grain in the Volga regions.

The second important waterway in point of quantity of wheat carried is the Dnieper. Very large quantities of wheat are shipped down the river to the port of Kherson, but the carrying capacity of the Dnieper is materially reduced by the unnavigable rapids[a] near Ekaterinoslav, which cut off direct communication between points above the rapids and the Black Sea. The commercial importance of the Dnieper is practically limited to the lower half, which serves as an outlet for a considerable part of the wheat exported, while not more than 5 to 10 per cent of the wheat carried is transported on the upper part, mainly to supply local markets.

The course of navigation on the remaining three rivers is comparatively short and leads directly to important exporting ports.

Considerable quantities of wheat flour also are transported on waterways, principally on the same rivers, but this flour is largely for internal markets and most of it is shipped up the rivers.

The growing importance of the waterways in the grain trade makes the condition of these highways of commerce a matter of much concern to the agricultural classes. Besides the climatic conditions, there are many geographical peculiarities which impede their usefulness. The prolonged winter with its heavy falls of snow and the sudden advent of spring annually cause floods which have increased within recent years under the influence of forest devasta-

[a] The possibility of building a local canal around the Dnieper rapids has been discussed in Russia for many decades, and recently it has been decided to undertake the work, which has been intrusted to American engineers. About $20,000,000 have been appropriated for this purpose. Such a canal will establish in Russia a large and important highway of commerce, which will be of greater importance than even a railway of equal length. The 195 miles of the Dnieper below the rapids have a carrying capacity almost one-half as great as that of the entire southwestern railroad system, with its 2,744 miles.

tion. These floods are followed in midsummer by a marked decrease in the volume of the streams, even to their drying up; the formation of sand banks and similar obstructions then impede navigation. Even the largest Russian river, the Volga, suffers annually from these conditions. The Russian agricultural classes never cease clamoring for an extensive plan of river improvements and the building of canals which, it is argued, would increase transportation facilities at a less cost than would the building of railways.

COST OF WATER TRANSPORTATION.

The charges for transportation on the waterways are free from Government regulation and are hence subject to competition and frequent changes. Being the result of bargaining, there are probably variations in the rates paid by individual shippers. The rates change during the season, frequently rising during the fall when shipments are heaviest; and they may be higher in the beginning of navigation and lower in the early fall. It is impossible to go into any detailed analysis of these fluctuations. Only the average annual rates calculated officially by the Ministry of Ways and Communications for twelve years and stated in kopecks per 1,000 poods, are shown in Table 14, recalculated into cents per 100 bushels per mile. Only the rates for through shipments on four main rivers leading into the Black and Azov seas are here given, as only these rates are of importance in the export wheat trade. Since the average distance traveled by wheat coming into these ports is also given in the statistical report, it was possible to calculate the average cost of transportation of that portion of wheat which arrives at the port on waterways. The average cost for each waterway has been calculated, and an average has been obtained by weighting the cost per bushel on each river by the quantity arriving in each of the four ports. The last column then shows that the average cost of bringing the wheat into port varies between 2 and 3 cents (the abnormal year 1892 being excluded); or, in nine out of the twelve years, between $2\frac{1}{2}$ and 3 cents. The seeming increase in this general average is caused by larger quantities of wheat coming from longer distances on the Don than in earlier years.

TABLE 14.—*Average cost of transporting wheat, by waterways, to ports, 1892–1903.*[a]

Year.	Shipments down the Dnieper to Kherson.			Shipments down the southern Boog to Nicolaiev.			Shipments down the Don to Rostov.			Shipments down the Dniester to Benderi.			Average distance.[b]	Average rate per bushel for all 4 ports.[b]
	Average rate per 100 bushels and 1 mile.	Average distance.	Average rate per bushel.	Average rate per 100 bushels and 1 mile.	Average distance.	Average rate per bushel.	Average rate per 100 bushels and 1 mile.	Average distance.	Average rate per bushel.	Average rate per 100 bushels and 1 mile.	Average distance.	Average rate per bushel.		
	Cents.	*Miles*	*Cents.*	*Cents.*	*Miles*	*Cents.*	*Cents.*	*Miles*	*Cents.*	*Cents.*	*Miles*	*Cents.*	*Miles*	*Cents.*
1892..	1.26	117	1.48	2.68	56	1.49	2.31	104	2.40	1.83	213	3.90	116	1.69
1893..	3.03	103	3.13	3.48	58	2.01	2.10	142	2.97	2.43	148	3.61	104	2.99
1894..	2.51	83	2.08	2.42	56	1.35	2.08	145	3.29	2.32	131	3.05	85	2.06
1895..	2.08	103	2.14	2.09	62	1.28	1.98	158	3.13	1.46	131	1.90	104	2.11
1896..	1.92	100	1.92	1.83	65	1.25	1.96	232	4.55	1.25	174	2.07	130	2.46
1897..	1.81	107	1.95	1.78	63	1.12	1.66	306	5.06	1.26	142	1.79	165	2.86
1898..	1.91	100	1.91	1.67	62	1.04	1.64	311	5.12	1.68	147	2.47	167	2.87
1899..	1.94	129	2.51	1.52	64	.97	1.86	217	4.02	1.28	158	2.02	150	2.91
1900..	1.26	117	1.47	1.70	62	1.05	1.69	267	4.51	1.44	171	2.46	175	2.74
1901..	1.46	128	1.87	1.87	64	1.19	1.88	284	5.33	2.17	125	2.71	171	3.04
1902..	1.91	107	2.04	2.09	57	1.19	2.14	240	5.22	1.96	123	2.42	130	2.69
1903..	1.80	96	1.72	2.48	58	1.37	2.20	264	5.80	1.76	115	2.01	133	2.71

[a] Compiled from Statistical Annual of the Ministry of Ways and Communications.

[b] The average was attained by weighing the averages for each of the four rivers by the total amount of wheat arriving at the port.

NOTE.—In converting kopecks into cents, the average annual values of the ruble were taken before 1897, namely, 48.8 cents in 1892, 50.3 cents in 1893, 52.4 cents in 1894, 52.3 cents in 1895, and 51.7 cents in 1896. Since 1897 the equivalent remained uniform at 51.5 cents.

On the Dnieper the average cost per bushel is usually less than 2.5 cents and has risen above that figure only twice during the 12 years. On the southern Boog the average cost is still smaller, about 1¼ cents, because the distances are shorter. On the Dniester the average cost was between 2 and 2½ cents during five of the last six years and the average distance is about 138 miles. Only on the Don is the cost considerably higher, varying from 4 to 6 cents within the last six or seven years, since the average distance is from 200 to 300 miles. This low cost of transportation is explained not only by the short distances but also by the low rates, especially when compared with the rates on Russian railways. The average rate per bushel per mile seldom rises over one-fiftieth of a cent per mile; it often falls to one-sixtieth or one-seventieth of a cent, while on the railroads the average export rate per bushel per mile for such short distances is much higher, namely, about one-twentieth of a cent for the distance of 100 miles, one twenty-sixth of a cent per mile for 200 miles, and one thirty-first of a cent per mile for the distance of 300 miles.

The averages of Table 14 probably make a showing somewhat too favorable. Perhaps the cost for the longest distances is more characteristic, as showing the highest transportation charges accruing to the cost of wheat when shipped by water.

TABLE 15.—*Usual rates of transportation per bushel of wheat for greatest distance over each of four important rivers.*

River.	Greatest distance—		Miles.	Usual rate per bushel in cents.
	From—	To—		
Southern Boog	Voznesensk	Nikolaiev	70	2.6– 3.9
Dniester	Soroki	Varnitzi	208	3.9– 6.5
Dnieper	Alexandrovsk	Kherson	189	7.8–10.4
Don	Pavlovsk	Rostov	746	15.6–23.4

PUBLIC ROADS.

DISADVANTAGES OF THEIR POOR CONDITION.

However backward the railway development of Russia or the progress in the development of the important waterways, the weakest point in the Russian transportation system is the insufficiency of highways from country districts to the railways.

In the beginning of the last century, when the growth of commerce demanded new facilities for transportation, and before the advent of the railway, the public roads were objects of governmental solicitude and many good ones were constructed. But since that time the growth of railways has greatly reduced their commercial importance. In 1903, there were altogether 16,150 miles of macadamized or gravel roads.

Most of these roads run along railways or waterways. Besides, there are in Russia about 135,000 miles of wide earth roads and about 660,000 miles of narrow country roads which serve as feeders from farms to shipping points. These are quite insufficient, considering the area of European Russia and the low railway density which makes the average distance from farms to the railway station so much greater. (See Tables 6 and 7.)

Estimating the total mileage of roads in Russia as about 800,000, the average density of country roads for European Russia is 1 mile per $2\frac{1}{2}$ square miles of surface, or 0.4 mile of country road per square mile of surface, while in Iowa the proportion was 1.84 miles, in Nebraska 1 mile, and even in Oregon, 0.36 mile.

The condition of the roads is a great obstacle to Russian commerce. A very small percentage of them is provided with a gravel or macadamized surface. Even the wide earth roads suffer from inclement weather and the narrow public roads are difficult of passage at all times and some of the time absolutely impassable.

The few large macadamized roads are under the supervision of the Ministry of Ways and Communications. The care of the wide earth roads is intrusted to the local zemstvos, whose financial means are very limited; finally, the narrow country roads, perhaps the most important, since they act as feeders to the railroads, must be repaired

by the peasants, and this work is done in a very unsatisfactory manner.

It is not unusual, therefore, for a village, even in the province of Moscow, that is, very near the industrial center, to be absolutely cut off from the outside world during a rainy autumn or spring. While this may be considered an extreme situation, the roads are for a considerable time almost useless for hauling farm products. These conditions force the delivery of grain to the shipping points during the end of summer and early autumn and are one of the causes of the congestion of freight at railway stations.

In the south of Russia, in Bessarabia and Kharkov, the roads are impassable for from 2 to 3 months at a time; in the central provinces, Kursk and Tula, for from 4 to 5 months at a time; and in the north and northeast, from 6 to 7 months at a time.

The construction of feeders to the railways has not kept pace with the railways, and thus the freight movements on the latter are directly dependent upon country roads; a heavy storm prevents the loading of freight cars at the station, while an improvement of weather may be immediately followed by a congestion of freight. This situation strikes the grain trade with special severity.

HIGH COST OF HAULING.

The unsatisfactory conditions mentioned have as their permanent effect the small wagon load and therefore a high cost of hauling to shipping points. The peasant's small cart is usually drawn by one horse and the condition of the roads generally frustrates efforts to introduce larger and stronger wagons and thus economize animal energy and human labor.

The normal one-horse load throughout almost all Russia is 20 to 25 poods (about 720 to 900 pounds), as against 3,000 pounds for a double team in the United States; when the roads are muddy, the loads may be reduced to from 10 to 15 poods (360 to 540 pounds).

The unsatisfactory condition of the country roads may be judged from the fact that out of 531 local committees which discussed the needs of agricultural industry in 1902, only 90 left the problem of good roads untouched. Of the remaining 441, only 40 found the condition of roads satisfactory. The reports of 400 of the committees are full of complaints against the conditions of the roads.

It is generally admitted that material improvement of the roads would, by a reduction in the cost of hauling, more than compensate for the expense of improvement. On the other hand, it is a condition peculiar to the Russian village that improved macadamized roads would present in the beginning disadvantages, the peasants' horses usually being unshod and the wooden wheels not being adapted to a stone bed.

To some extent this increased cost of hauling, due to bad roads, is usually offset by the low wages. Many of the large estate owners who till their own land hire peasants, with their implements and horses, for farming purposes; few estate owners keep enough horses to haul their own grain to market.

As was shown in Bulletin No. 42, even during harvest the cost of hiring a man and a one-horse team varies from 50 cents to $1 per day, the average being 66.3 cents, while the American farmer usually pays from $3 to $4 for team service. But, considering the very small load customary in Russia—less than half that of the American farmer—and on an average, the longer and slower haul, the difference in cost may not be so great as it seems.

TRANSPORTATION BY SEA.

SMALL RUSSIAN MERCHANT MARINE.

Only a small share of the Russian grain exports leaves Russia by rail; more than 90 per cent is transported over the high seas. There is no scarcity of vessels and usually a brisk competition between them. As shown in Table 16, the Russian flag carries only a small part of the freight leaving Russian ports; about 7 per cent of the tonnage leaving southern ports and 9 per cent of that from the Baltic ports; moreover, the Russian tonnage is actually declining proportionately to the total tonnage. In both the Baltic and southern commerce, the British fleet predominates, though fleets of other nations compete with it more and more successfully.

In the Baltic ports the British tonnage has decreased from 43 per cent in 1890–1894 to 27 per cent in 1900–1904, while the German tonnage has increased in the same time from 19 per cent to 24 per cent and the Danish tonnage from 18 per cent to 22 per cent. Swedish and Norwegian vessels are also gaining in importance. The British flag still waves over half of the tonnage leaving the southern ports, while from 10 to 15 years ago it claimed 60 per cent. English vessels carry practically all the grain from the southern ports to British ports and the northern ports of the Continent. Greek, Italian, Austrian, and, to a lesser degree, French and German, vessels ply between the ports of the Black and Azov seas and the ports on the Mediterranean Sea.

TABLE 16.—*Tonnage of shipping leaving Russian seaports, by nationalities, 1890–1904.*[a]

Nationality.	1890–1894.		1895–1899.		1900–1904.	
Black and Azov seaports:	*Tons.*	*Per cent.*	*Tons.*	*Per cent.*	*Tons.*	*Per cent.*
Russian flag	358,444	8.2	504,876	9.4	406,608	7.1
British flag	2,633,379	60.2	2,963,940	55.1	2,842,923	49.9
Greek flag	352,350	8.0	406,263	7.6	687,386	12.1
Italian flag	193,238	4.4	335,700	6.3	568,900	10.0
Austro-Hungarian flag	208,245	4.8	340,565	6.3	345,256	6.1
German flag	64,116	1.5	105,235	2.0	247,372	4.3
French flag	195,732	4.5	265,795	4.9	243,626	4.3
All other flags	369,805	8.4	453,035	8.4	358,477	6.2
Total tonnage	4,375,309	100.0	5,375,409	100.0	5,700,548	100.0
Baltic seaports:						
Russian flag	216,767	7.6	266,878	7.6	329,040	9.0
British flag	1,227,389	43.0	1,302,984	37.2	986,658	27.0
German flag	531,713	18.6	640,871	18.3	885,022	24.2
Danish flag	503,411	17.6	734,235	20.9	801,419	21.9
Swedish flag	152,126	5.3	219,913	6.3	285,277	7.8
Norwegian flag	151,910	5.3	231,882	6.6	240,331	6.6
All other flags	72,132	2.6	108,858	3.1	128,417	3.5
Total tonnage	2,855,448	100.0	3,505,621	100.0	3,656,164	100.0

[a] Compiled from Obzor vnĭeshneĭ torgovli Rossiĭskoĭ Imperii.

PORTS.

DESCRIPTION OF FACILITIES.

As will be shown by statistics of exports, the Black and Azov seas have all the important wheat-exporting ports. The coast of these seas is crowded with settlements, but only a few ports are of importance, mainly those which are located near the mouth of important rivers.[a] Thus the three ports, Odessa, Nikolaiev, and Rostov together ship about two-thirds of the entire Russian wheat exports.

Odessa, lying on the northwestern coast of the Black Sea, serves as a point for the concentration of shipments from the southwestern provinces. It is the terminus of the Southwestern Railway and, lying between the mouths of the three main western rivers, Dniester, southern Boog, and Dnieper, it receives shipments directly from the stations on these rivers.

Nikolaiev has also a railroad as well as an important waterway, the southern Boog. The trading region of Nikolaiev extends through the provinces of Kherson, Ekaterinoslav, and northward, taking in Little Russia and the southern provinces of the central agricultural region, Kursk and Voronezh. Until 1894 the port facilities were very inadequate; the channel to the sea was shallow and did not permit deep-draft steamers to approach the city, so that part of the cargo had to be loaded from barges at Otchakov. In 1902 the channel was deepened to 28 feet, so that 6,000-ton steam-

[a] For data which follow see Max Winters, Zur Organization des südrussischen Getreidehandels. Leipzig, 1905.

ers can enter the harbor without difficulty. Ice breakers were provided in 1902, and the port may be considered as a nonfreezing one.

Another port in the same region is Kherson, which has an excellent geographical location at the mouth of the Dnieper, but the harbor facilities are inadequate and permit the loading of steamers drawing only 16 or 17 feet. With the completion of the improvements already undertaken, and the solution of the problem of the Dnieper rapids, Kherson will become an important competitor of Odessa and Nikolaiev.

On the Crimean Peninsula are many ports, but on account of inadequate railroad facilities, they are only of local significance. For many years Sebastopol was a commercial port of first importance, being the southern terminus of a large railway system, but in 1897 it was closed to commerce for military considerations. The two main ports now are Theodosia and Eupatoria, the latter of which has no railway connections. These ports serve mainly as auxiliary points for marketing the crops of Crimea, the trade being mainly in the hands of branches of Odessa and Nikolaiev firms.

On the Azov Sea the main port is Rostov-on-the-Don, which serves the eastern part of New Russia, the southeast, and also a considerable portion of Northern Caucasia, with which a railway line connects it. It has an important waterway, the Don, and several railroads. It is also an important center for grain brought in by peasants. The development of the grain trade of Rostov is quite remarkable, considering that the port has no harbor fit for large steamers, so that the grain is shipped in small vessels to Taganrog and reloaded there into seagoing vessels. Of the other ports in this region, the most important are Mariupol and Berdiansk.

Novorossiisk, a port on the eastern shore of the Black Sea, commands an entirely separate region of Northern Caucasia, and its importance is growing since the building of a railroad in 1890, connecting it with the Caucasian Railway. This has deflected a considerable current of Caucasian wheat from Rostov, over which it has the advantage of a port open the entire year, of a cheaper ocean rate by 1 to 1½ shillings per ton. It deals mainly in Kubanka, a durum wheat.

The port facilities of all these ports are rather meager from the American point of view. As was stated, only Odessa, Nikolaiev, Taganrog, and Novorossiisk have adequate facilities for large vessels. Only Nikolaiev, Odessa, and Novorossiisk have large elevators and grain warehouses, and even in these ports, with the possible exception of Novorossiisk, they are not sufficient to accommodate the entire quantity of grain handled.

OCEAN FREIGHT RATES.

COMPARATIVE CHANGES.

In considering the cost of ocean transportation, Russian grain is not at a disadvantage, for the grain is carried by the merchant marine of European nations, and the general tendency toward cheapening ocean transportation has benefited Russian grain.

In Table 17 are shown, for the years 1872, 1882, 1895, and 1900, the average ocean freight rates per bushel, as calculated by Broomhall, on wheat brought to Great Britain, both from the southern and northern ports of Russia and from the Atlantic and Pacific ports of the United States.

A great deal of the history of ocean transportation is reflected in this table. During the seventies, eighties, and early nineties, ocean freight rates were rapidly declining, but since the end of the nineteenth century a reaction has taken place.

The decline in rates affected especially the trade from the southern ports so that the rates are now only about one-fourth of what they were 30 years ago; then the rates from the south Russian ports to Great Britain were about 30 per cent higher than those from the Atlantic ports of the United States, but in 1900 they were substantially equal; on the other hand, the differences between the rates from the southern and Baltic ports of Russia have also been greatly reduced. Thirty years ago the southern rate was 4 times as high as the Baltic, but in 1900 only 1½ times as high. This latter fact explains to some extent why the exports from the southern ports have risen at the expense of the Baltic ports, as will be shown by the statistics of trade movements in a later section.

TABLE 17.—*Average rate of ocean freight per bushel of wheat brought to British markets.*[a]

Calendar year.	Russia.		United States.	
	South.	North.	Atlantic.	Pacific.
	Cents.	*Cents.*	*Cents.*	*Cents.*
1872	25.85	6.08	19.77	.....
1882	16.73	6.08	14.45	39.54
1895	6.08	3.04	5.32	20.92
1900	6.59	4.56	6.84	24.59

[a] Broomhall's Corn Trade Year Book, 1891–92.

OCEAN FREIGHT RATES FROM NEW YORK AND ODESSA.

The detailed data of Table 18, giving the cost of ocean transportation from New York and Odessa to British markets by monthly and annual averages for the past ten years, emphasize the fact that differences of ocean freight rates do not now much affect the competitive

position of these two ports in the grain markets. Considerable fluctuations are inevitable, but the generally low level of ocean freight rates makes them a secondary factor in the price of wheat; besides, the rates from both countries to the British markets fluctuate at about the same normal level. For the ten commercial years, 1896–1906, the mean rate from New York was 4.63 cents per bushel and from Odessa 5.86 cents, or about $1\frac{1}{4}$ cents more.

TABLE 18.—*Ocean freight rates per bushel of wheat from the United States and Russia to Great Britain, 1896–1906.*[a]

Year and port.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Mean for year.
1896–97:	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
New York to Liverpool	5.54	8.26	9.78	10.21	7.06	6.14	5.32	5.38	5.00	3.53	3.91	5.65	6.35
Odessa[b]	5.65	8.53	11.95	7.17	4.89	5.92	4.83	5.27	5.38	4.83	4.62	4.45	6.14
1897–98:													
New York	6.84	7.71	9.18	8.74	7.60	6.79	6.19	6.63	7.60	9.34	5.21	3.58	7.12
Odessa	5.32	7.17	6.52	6.79	7.01	6.03	5.70	5.32	7.01	7.71	5.87	5.27	6.30
1898–99:													
New York	4.18	5.92	9.29	9.89	8.42	6.68	3.10	2.93	2.93	4.56	4.56	4.78	5.59
Odessa	6.41	7.39	8.42	7.17	7.28	6.73	5.49	4.94	5.16	5.70	5.54	5.16	6.30
1899–1900:													
New York	6.50	6.29	8.51	7.22	6.08	6.68	7.43	7.81	8.09	7.94	6.95	5.65	7.12
Odessa	5.70	6.88	7.10	5.30	5.17	5.34	6.15	6.11	5.81	5.95	6.84	8.16	6.19
1900–1901:													
New York	7.93	9.34	8.58	6.68	5.65	5.11	3.80	2.23	2.99	2.34	3.04	3.15	5.05
Odessa	8.85	10.27	9.83	5.70	6.73	6.57	5.11	4.45	5.54	5.27	5.16	4.89	6.52
1901–2:													
New York	2.50	2.06	3.04	2.23	2.17	2.12	3.20	3.20	3.20	3.20	3.20	3.20	2.77
Odessa	6.03	6.35	6.19	6.19	6.84	5.87	5.27	4.89	4.73	4.89	4.73	4.89	5.70
1902–3:													
New York	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
Odessa	6.52	6.84	6.84	5.21	4.73	4.73	5.21	4.89	4.73	5.38	4.56	4.89	5.38
1903–4:													
New York	3.15	3.15	3.15	2.63	2.63	2.50	2.36	3.41	2.10	2.10	2.10	2.10	2.62
Odessa	6.79	6.79	6.30	5.87	5.21	5.38	5.43	5.02	4.73	4.83	4.89	4.64	5.49
1904–5:													
New York	2.10	2.10	2.10	2.10	3.55	3.55	2.63	3.41	2.63	2.63	2.10	2.36	2.61
Odessa	5.16	6.25	6.46	4.73	4.45	4.45	4.56	4.35	4.40	4.83	5.05	5.49	5.01
1905–6:													
New York	2.63	3.15	4.73	6.70	6.30	4.73	4.06	3.35	2.89	2.89	2.20	2.43	3.84
Odessa	5.76	5.76	7.17	6.52	6.52	6.35	5.05	4.73	4.73	4.73	4.78	5.11	5.59
1906–7:													
New York	3.15	3.05	3.55	2.63	3.55	3.61	.....	.....	.....	.....	.....	.....	.....
Odessa	6.73	5.38	7.01	6.08	5.49	5.46	.....	.....	.....	.....	.....	.....	.....

[a] Compiled from 1896–97 to 1902–3, Broomhall's Corn Trade Year Book, 1903; 1903–1907, Odessa rates from all the charters in Broomhall's Corn Trade News Supplement; New York quotations 1903–1905, from New York Produce Exchange statistical reports; 1906, New York quotations from Lunham and Moore's Weekly Circular.

[b] To London, Hull, Antwerp, or Rotterdam.

There has been a decided difference in favor of the American grain since the winter of 1900–1901, when the mean rate per bushel from New York dropped from 7 cents to 5 cents, and within the next year to 3 and even 2 cents. Various explanations have been given of this sudden change, among others the excessive competition of tonnage released by the termination of the Boer war. During the four commercial years, 1902–1905, the average rate from New York was 2.8 cents and from Odessa 5.4 cents, or about twice as much; but during the year 1906 a marked tendency toward the strengthening of the Atlantic rates asserted itself.

TABLE 19.—*Cost of ocean transportation of wheat per bushel from Russian to European ports, for two years ending August 31, 1906.*[a]

Route.	Autumn.		Winter.		Spring.		Summer.		Mean for the year—	
	Sept.–Nov., 1904–5.	Sept.–Nov., 1905–6.	Dec.–Feb., 1904–5.	Dec.–Feb., 1905–6.	Mar.–May, 1904–5.	Mar.–May, 1905–6.	June–Aug., 1904–5.	June–Aug., 1905–6.	1904–5.	1905–6.
Baltic ports to England:										
St. Petersburg to—	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
London	.....	3.41	.....	.....	.....	3.59	.....	3.57	.....	3.53
Hull	.....	3.50	.....	.....	.....	3.23	.....	3.36	.....	3.36
Leith	.....	3.09	.....	.....	.....	3.68	.....	3.76	.....	3.51
Reval to London, Hull	3.19	3.19	3.31	2.94	2.94	2.94	3.23	2.94	3.17	3.00
Libau to—										
London	2.91	3.63	2.49	.....	2.73	3.48	3.51	3.30	2.91	3.47
Hull	3.06	3.63	2.66	.....	2.81	3.48	3.51	3.30	3.01	3.47
Leith	3.05	3.51	2.66	.....	2.80	3.48	3.52	3.41	3.00	3.47
East shore of England	4.10	4.03	3.78	.....	3.87	.....	4.05	.....	3.94	4.03
English Channel	4.56	4.47	4.29	.....	6.39	.....	4.35	.....	4.89	4.47
Riga to east shore of England	3.46	3.25	3.43	3.25	3.01	3.25	3.25	3.25	3.27	3.25
Mean	3.48	3.57	3.23	3.10	3.51	3.39	3.63	3.36	3.46	3.56
Baltic ports to northern European ports:										
St. Petersburg to—										
Rotterdam	.....	3.77	.....	.....	.....	3.64	.....	3.69	.....	3.70
Hamburg	.....	3.97	.....	.....	.....	3.81	.....	3.87	.....	3.88
Stettin	.....	3.64	.....	.....	.....	2.59	.....	3.73	.....	3.32
Lübeck	.....	3.79	.....	.....	.....	2.27	.....	3.47	.....	3.17
Reval to Germany	2.59	2.81	2.59	2.59	2.59	2.59	2.85	2.59	2.65	2.64
Libau to—										
Rotterdam	2.99	3.55	2.49	.....	2.73	3.48	3.53	3.41	2.93	3.48
Bremen	3.17	4.06	2.55	.....	2.98	.....	4.18	.....	3.28	4.06
Antwerp	3.19	3.66	2.76	.....	2.93	3.25	3.05	3.64	2.98	3.52
Stettin	2.92	2.86	2.73	.....	2.76	2.86	2.81	3.05	2.81	2.93
Lübeck	2.89	2.86	2.76	.....	2.77	2.86	2.81	3.05	2.81	2.93
Hamburg	3.10	3.89	2.98	.....	3.02	3.50	3.71	3.50	3.20	3.58
Denmark	3.45	3.40	3.53	.....	3.41	.....	3.26	3.97	3.41	3.68
Sound Islands	3.45	3.34	3.45	.....	3.45	.....	3.42	3.89	3.44	3.62
Riga to—										
The Continent (Havre to Hamburg)	3.37	3.25	3.35	3.25	2.97	3.25	3.25	3.25	3.46	3.25
Stettin	3.30	3.18	3.22	3.55	2.96	3.37	2.97	3.02	3.09	3.29
Lübeck	3.30	2.97	3.22	3.55	2.96	3.37	2.86	3.02	3.05	3.25
Denmark	4.06	4.13	4.13	4.40	4.24	4.35	4.11	4.61	4.13	4.37
East Norway	4.13	4.45	4.13	4.72	4.28	4.45	4.35	4.61	4.24	4.56
East Sweden	3.94	4.13	3.79	4.40	3.92	4.13	4.03	4.30	3.93	4.24
Mean	3.32	3.56	3.18	3.78	3.20	3.36	3.41	3.59	3.29	3.55
South Russian ports to England:										
Odessa to—										
London	4.95	6.31	4.20	5.23	4.50	4.47	5.30	5.01	4.72	5.25
Hull	4.99	6.34	4.25	5.54	4.45	4.44	5.26	5.09	4.71	5.36
Liverpool	5.39	.....	4.57	5.68	4.38	5.06	4.24	5.87	4.65	5.54
Nikolaiev to London	4.89	6.29	4.41	5.11	4.48	4.36	5.36	4.71	4.79	5.12
Mean	5.06	6.31	4.36	5.39	4.45	4.58	5.04	5.17	4.72	5.32
South Russian ports to northern European ports:										
Odessa to—										
Antwerp	5.00	6.42	4.33	5.50	4.53	4.47	5.41	5.16	4.80	5.45
Rotterdam	4.83	6.34	4.18	5.15	4.33	4.30	5.13	5.05	4.60	5.21
Nikolaiev to—										
Rotterdam	4.79	6.30	4.39	5.01	4.54	4.29	5.38	4.81	4.77	5.10
Hamburg	5.20	6.66	4.78	5.36	4.95	4.69	5.68	5.18	5.15	5.47
Mean	4.96	6.43	4.42	5.26	4.59	4.44	5.40	5.05	4.83	5.31
South Russian ports to southern Europe:										
Odessa to—										
Adriatic Sea	4.09	5.17	3.70	4.40	3.76	4.11	4.18	4.09	3.94	4.44
Mediterranean Sea	3.71	4.71	2.93	4.09	3.42	3.80	3.82	3.59	3.47	4.05
Nikolaiev to—										
Marseille	4.28	5.24	3.84	4.53	4.09	4.06	4.24	3.85	4.11	4.42
Genoa	4.14	5.24	3.79	4.56	4.10	4.07	4.21	3.91	4.06	4.45
Mean	4.06	5.09	3.56	4.40	3.84	4.01	4.11	3.86	3.90	4.34

[a] Compiled from Vnĕshnîaîa Torgovlîa po Evropeiskoi granitzĕ, Sept. 1904–Aug., 1906.

Finally, the difference in rates from the various Russian ports to various European ports deserves attention. The average ocean rates per bushel of wheat from the most important Russian to the most important European ports are given in Table 19, for the two crop years ended August 31, 1906, as well as by seasons. The mean rates for the 5 groups of routes have also been calculated, and these mean rates in a general way indicate the cost of transportation of a bushel of wheat (a) from the Baltic ports to England, (b) Baltic ports to northern European ports, (c) south Russian ports to England, (d) south Russian ports to northern European ports, and (e) south Russian to southern European ports. From the point of view of their importance in the wheat trade this order should be reversed. It appears from this table that there is no essential difference in the cost of shipping wheat from the southern ports to England or to the northern European ports; also that the difference in cost as between the different ports is slight, seldom amounting to as much as one-half cent a bushel.

The average rate from the Baltic ports is only about 2 cents less than that from the southern ports, sometimes not even so much as that; but in the case of a few German ports the rate from Reval or Libau was considerably lower. Yet the difference is not so great as to overcome the differences in cost of transportation to the port, depending upon the entire Russian railway-rate policy.

A comparison of the ocean freight rates for different seasons shows higher rates for autumn, when shipments are heaviest, and lower rates for winter, when shipments are lightest. It is probable that the true annual average cost of ocean transportation is higher than the annual mean of the monthly averages would indicate.

CONCLUSIONS AS TO COST OF TRANSPORTATION.

COMPARISONS WITH THE UNITED STATES.

It is not easy to determine the average cost of transporting Russian wheat from producer to foreign consumer. There are three main stages in the process of transportation: First, hauling to the railway station; second, shipment by rail or water to the port; and third, ocean transportation. The preceding study of the means of transportation shows that all these steps, with the possible exception of river transportation, are more costly in Russia than in the United States. For a more detailed calculation sufficient data are lacking.

There is no way of estimating the average cost of hauling wheat to the station, as has been done for the United States,[a] the estimate being

[a] Bulletin No. 49, Bureau of Statistics.

5.4 cents per bushel. The average haul of wheat on Russian railways varies in different years from 300 to 600 versts (200 to 400 miles), but, this being an average, the freight rate for such distance as per formula can not be taken, and data in regard to average cost are not regularly published in the statistical reports of the Russian railways. For grain in general the average cost of transporting has been calculated as follows:

TABLE 20.—*Average cost of transporting grain on Russian railways, 1889–1895.*[a]

Year.	Export trade.			Internal trade.		
	Average haul.	Cost of transportation.		Average haul.	Cost of transportation.	
	Miles.	*Kopecks per pood.*	*Cents per 100 lbs.*	*Miles.*	*Kopecks per pood.*	*Cents per 100 lbs.*
1889	437	13.68	19.51	253	9.75	13.90
1890	421	13.27	18.92	249	9.58	13.66
1893	408	12.18	17.37	278	9.30	13.26
1894	407	12.09	17.24	291	9.47	13.50
1895	444	13.14	18.74	326	10.33	14.73

[a] Compiled from: Die Eisenbahntarife Russlands für Getreide und Mehl im letzten Decennium by Piotr Werhyo. (Schriften des Vereins für Socialpolitik, LXXXIX, p. 247.)

But these data refer to all grain, and the average haul of export wheat being much shorter than of most other grains, the average cost must be correspondingly lower. In 1895, the average cost of transporting wheat on railways for export was calculated to be 9.17 kopecks per pood, or 13 cents per 100 pounds (7.8 cents per bushel). In comparison with these averages the wheat shipped by water to the southern ports may be considered as having a differential, which reacts upon the price to the producer, rather than the general price in the larger markets. Finally, ocean transportation costs from 5 to 6 cents. This would raise the average cost of transportation to about 13 cents, not counting the cost of hauling, an average charge which is probably not higher than in the United States. Thus it is the characteristic condition of Russian wheat production that its advantageous location near the ports is neutralized by the disadvantage of high cost of transportation. It contains a promise of great advantage over American wheat in the future, when the cost of transportation per mile in Russia shall approach the lower level obtaining in this country.

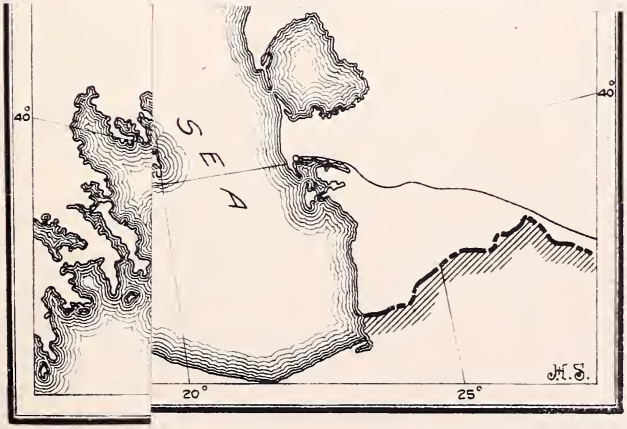
CURRENTS OF THE WHEAT TRADE.

LINES ALONG WHICH THE CROP IS DISTRIBUTED.

EXPORT ROUTES.

The geographical distribution of the cereals described in detail in a preliminary study of Russian wheat,[a] and the location of the main Russian ports, determine the general currents of the crop movement.

[a] See Bulletin No. 42, Bureau of Statistics, Russia's Wheat Surplus.



ANDREW B. GRAHAM CO., L

RUSSIA

EXPLANATION

MAIN RAILWAYS ON WHICH SHIPMENTS OF WHEAT ORIGINATE.
RAILWAYS OVER WHICH LARGE SHIPMENTS OF WHEAT ARE TRANSPORTED
ALL OTHER RAILWAYS.

1 EKATERININSKAYA R.R.
2 KURSK KHARKOV & SEBASTOPOL R.R.
3 KHARKOV NIKOLAEV R.R.
4 SOUTHWESTERN R.R'S.
5 SAMARA SLATOUST ORENBURG R.R.
6 RYAZAN URLSK R.R.
7 SOUTHEASTERN R.R'S.
8 MOSCOW KIEV VORONEZH R.R.
9 VLADIKAVKAS R.R.
10 BALTIC R.R.
11 LIBAU ROMNY R.R.
12 MOSCOW KURSK R.R.
13 NICHOLAS R.R.
14 PERM R.R.
15 RIGA OREL R.R.
16 SYSRAN VIASMA R.R.
17 MOSCOW WINDARA R.R.
18 MOSCOW KAZAN R.R.

ARCTIC OCEAN
WHITE SEA
GULF OF BOTHNIA
BALTIC SEA
GULF OF FINLAND
BALTIC PORT
ARKHANGEL
KOTLASS
Dwina Riv.
VIATKA
PERM
TYUMEN
Tobol Riv.
EKATERINBURG
CHELEABINSK
Volga R.
NIZHNI
OKHAGAN
Kama Riv.
UFA
SIMBIRSK
SAMARA
ORENBURG
Ural Riv.
URALSK
BARATOV
TZARITZIN
ASTRAKHAN
CASPIAN SEA
ARAL SEA
BLACK SEA
AEGEAN SEA
TIFLIS
PETROVSK
VLADIKAVKAS
STAVROPOL
EKATERINODAR
NOVOROSSIISK
KERCH
FEODOSIA
SEBASTOPOL
KHERSON
GENICHENSK
NIKOLAIEV
BENDERY
ODESSA
KISHINEV
EKATERINOSLAV
POLTAVA
KIEV
ZHITOMIR
CHERNIGOV
ROMNY
KURSK
KORENEVO
TAMBOV
KOSLOV
OREL
TULA
KALUGA
VIASMA
MOSCOW
VLADIMIR
TVER
YAROSLAVL
KOSTROMA
KINESHMA
NOVOCHERKASK
MARIUPOL
BERDIANSK
PETROVSK
KOTOVSK
VOLOGDA
KYRITNSK
PSKOV
NOVGOROD
REVAL
RIGA
MITAU
LIBAU
KALISH
WARSAW
SIEDLETZ
BRODNO
VILNA
MINSK
VITEBSK
SMOLENSK
DWINSK
Dnieper R.
Bug R.
Niemen R.
Vistula R.
Oka R.
Desna R.
Berezina R.
Pripet R.
Dniester R.
Prut R.
Donetz R.
Don R.
Moscow Canal
Volga Canal
Ladoga Canal
SCALE OF MILES
0 50 100 200 300
H.S.

MAP OF RUSSIA WITH ROUTE OF WHEAT MOVEMENT

These currents differ considerably from those in the United States, principally because of the absence of colossal internal markets like Chicago, Duluth, Buffalo, or St. Louis, or such milling centers as Minneapolis. The difference is especially great in the case of wheat, because the distance between the center of wheat production and the ports is much smaller in Russia than in the United States.

One of the greatest living authorities on the Russian grain trade, M. V. Kasperoff, describes the main routes of the movement of grain in Russia as follows:[a]

Russian grain mainly takes the following routes:

(1) From east to west for the needs of internal consumption and of exportation. This grain traverses the greatest distances; it crosses European Russia, almost following the geographic parallel, or it follows the Volga and its system of canals; or takes the railways connecting the Volga at Kajam, Simbersk, Samara, Saratoff, or Tzaritzin with the two capitals, the Baltic ports and the land frontiers.

(2) The shortest way southward to the Black and Azov seas, by railroad, and by the Dniester, the southern Boog, the Dnieper, the Don, the Volga, and even by wagon from places near the sea. This grain is mainly cereals destined for export.

(3) Toward the north, along the railway line, Perm-Kotlass, then by the Dvina to Archangel. This is the route taken by the Siberian grain for export.

(4) Finally, by concentration toward the industrial region dominated by Moscow.

Of these four main routes the second is the most important in the case of wheat, because of the proximity of the southern seaports to the wheat belt, and the relative importance of this route becomes still greater when the export trade is considered. Both the first route, east to west, and the fourth, concentration toward Moscow (which in case of wheat means a movement from south northward), are mainly routes for grain intended for domestic consumption; the third route—to Archangel—while primarily an export route, is spasmodically utilized and has not yet acquired great importance.

MAIN WHEAT RAILWAYS.

The movement over these routes can best be studied from the very complete railway statistics. In Table 21 the quantities of wheat shipped over the 8 main wheat roads are given. The largest shipments are over the Southwestern Railway, the main line of which runs from Graevo, on the northern Prussian frontier, to Odessa

[a] Commerce des Céréales, par M. V. Kasperoff (in La Russie à la fin du 19e siècle), par. 1900, pp. 726–727.

through the southwestern region and the western part of New Russia. On the southern part of this railway the wheat moves toward Odessa; on the northern part to the Prussian frontier, the movement northward being much less important.

The Kharkov-Nikolaiev Railway connects Little Russia with the port of Nikolaiev. Almost all the wheat transported over this route is sent to Nikolaiev and destined for export. It is a very important trunk line, and carries a great quantity of wheat originating at stations on the other roads.

TABLE 21.—*Wheat transported on the eight chief railways, 1893–1903.*[a]

Year.	Ekaterinskaya Railway.	Kursk, Kharkov, Sebastopol Railway.	Samara, Slatoust Railway.	Kharkov, Nikolaev Railway.	Southwestern Railway.
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
1893	6,317,000	14,497,000	5,071,000	8,069,000	18,592,000
1894	7,073,000	16,870,000	3,126,000	9,890,000	23,711,000
1895	5,551,000	12,201,000	5,785,000	10,053,000	32,568,000
1896	4,710,000	8,242,000	7,809,000	9,926,000	29,880,000
1897	4,898,000	6,673,000	13,625,000	10,908,000	19,698,000
1898	5,210,000	7,451,000	10,430,000	10,432,000	23,659,000
1899	3,115,000	6,024,000	8,700,000	5,339,000	19,393,000
1900	3,120,000	6,612,000	17,169,000	4,707,000	14,673,000
1901	3,104,000	6,590,000	13,111,000	8,159,000	29,798,000
1902	8,564,000	9,659,000	7,957,000	12,753,000	43,958,000
1903	12,691,000	10,216,000	10,764,000	14,754,000	52,966,000

Year.	Vladikavkas Railway.	Riazan Uralsk Railway.	Southeastern Railway.	Total eight railways.
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*
1893	22,168,000	998,000	7,243,000	82,955,000
1894	20,366,000	2,535,000	8,981,000	92,552,000
1895	19,677,000	7,148,000	7,095,000	100,078,000
1896	15,577,000	14,781,000	12,137,000	103,062,000
1897	7,936,000	8,743,000	13,758,000	86,239,000
1898	8,695,000	11,968,000	14,730,000	92,575,000
1899	11,598,000	10,134,000	10,708,000	75,011,000
1900	11,132,000	11,909,000	12,834,000	82,156,000
1901	15,172,000	10,423,000	10,026,000	96,383,000
1902	20,800,000	12,476,000	12,458,000	128,625,000
1903	23,806,000	16,050,000	17,901,000	159,148,000

[a] Compiled from the Statistical Reports of the Russian Ministry of Ways and Communications.

The Ekaterininskaya Railway runs east and west in the southern part of New Russia and connects with the last-named railroad, to which most of the wheat, especially that destined for Nikolaiev and for export, is transferred.

The Kursk-Kharkov-Sebastopol Railway connects the agricultural center with Tauridian ports; important wheat shipments on this road begin some 60 miles south of Kharkov and originate mainly in the Provinces of Ekaterinoslav and Tauridia.

The Southeastern Railway system consists mainly of three stem lines: (a) Orel-Tzaritzyn, connecting the lower Volga region with the center—almost all the wheat on this line moves toward the center; (b) Koslov-Rostov, from the Province of Tambov to the port of Rostov, to which most of the wheat is consigned, and Balashov-

Kharkov, connecting the middle Volga region with Kharkov and also over railroad (2) and (4) with the southern ports. The first two railroads are mainly carriers for the domestic markets.

The Ryazan-Uralsk Railway connects the far southeast with the center; all the wheat carried moves to Ryazan and thence to Moscow.

The Samara-Slatoust Railway connects, through one branch, the Siberian Railway, and, through another, Orenburg with Volga. The wheat from this region continues the railway route to the consumption market of the center and the northwest, and only small quantities of it are exported.

Finally, the Vladikavkas Railway consists mainly of two trunk lines running at right angles to each other, one running from Vladikavkas to Rostov, the other from Tzaritzin, on the Volga, to Novorossiisk. This railroad carries the wheat from Northern Caucasia to Novorossiisk and Rostov.

Of these 8 railways, 5 serve the export trade mainly and 1 (the Vladikavkas Railway) partly.

The quantities shipped annually over each of these 8 railways fluctuate considerably, due undoubtedly to the variations in crops so characteristic of Russian agriculture. But, as shown in Table 22, from 90 to 96 per cent of all the wheat transported on Russian railways in 1900–1903 was shipped over these roads, which had in 1903 a mileage of 13,300, or 35 per cent of the total for Russia. It does not follow, however, that only the remaining 4 to 10 per cent of wheat transported was shipped on the remaining 65 per cent of the railway system. The wheat shipments originating in the regions of the 8 railway systems mentioned must be distributed over the entire country and carried to their destination in part by other railroads. As shown in the same table, of the gross total wheat transported (not discounting duplication of wheat transferred from one railway to another), the 8 roads claimed in 1900–1903 about 75 per cent. Several other railways transport considerable quantities of wheat. These are, first, those roads concentrating toward Moscow, the Moscow-Kasan, Moscow-Brest, Sysran-Viasma, which, as said before, carry for the domestic trade only; and also the roads leading to the Baltic ports, the Baltic, the Libau-Romny, and the Riga-Orel.

The latter 3 railways are, or perhaps have been, of greater importance to the export trade in wheat. The Baltic railway touches Reval and Riga, and the port facilities of the other railways are indicated by their names. These ports have also the great advantage of shorter distances to many important foreign markets and therefore of cheaper rates. But they have the great disadvantage of longer hauls from the center of wheat production. There the influence of railway-rate systems constructed upon a modified mileage basis becomes most potent. Before the establishment of such regulations, railway competition

could divert a great deal of the wheat traffic to the Baltic ports, while now the difference in rates is considerable, and only rarely does the difference in ocean rates overcome it.

AVERAGE HAUL OF WHEAT.

There is the significant difference between conditions of wheat transportation in the United States and those in Russia that in Russia exporting ports are nearer to the productive area than to the most important domestic markets, a condition that is exactly reversed in the United States.

One important result of this difference is that the average run of wheat on railways is much shorter in Russia than in the United States. The average, as computed annually in the reports of the Ministry of Ways and Communications, varies considerably from year to year, depending primarily upon the conditions of the crop, a failure of crop in south Russia usually raising the average run, as it evidently must. The average run fluctuates from about 200 miles to 500 miles, rising above 300 miles during years of decided crop failures, as in 1892 or 1897, and in 15 years out of 21 the average distance was between 190 and 300 miles.

TABLE 22.—*Wheat transported on Russian railways, 1893–1903.*

Year.	Total wheat shipped.			Gross total of wheat transported.		
	All railways.	Eight main railways.		All railways.	Eight main railways.	
	Bushels.	*Bushels.*	*Per cent.*	*Bushels.*	*Bushels.*	*Per cent.*
1893	92,913,000	82,955,000	89.3	141,640,000	112,267,000	79.3
1894	100,352,000	92,552,000	92.2	141,592,000	112,361,000	79.4
1895	110,562,000	100,078,000	90.5	152,987,000	118,077,000	77.2
1896	116,321,000	103,062,000	88.6	170,059,000	123,963,000	72.9
1897	105,204,000	86,239,000	82.0	208,650,000	114,603,000	54.9
1898	105,985,000	92,575,000	87.4	174,593,000	138,296,000	79.2
1899	85,095,000	75,011,000	88.2	119,794,000	90,710,000	75.7
1900	90,148,000	82,156,000	91.1	153,605,000	99,901,000	65.0
1901	106,181,000	96,383,000	90.8	164,289,000	118,489,000	72.1
1902	136,631,000	128,625,000	94.1	185,431,000	151,744,000	81.8
1903	165,517,000	159,148,000	96.2	222,676,000	182,643,000	82.0

As an illustration of this advantage possessed by Russian wheat, the data of Table 23 may be quoted to show the distances wheat was transported by railways to the markets in 1902, the only recent year for which these data are available. As many large cities are in the belt, more than half of the wheat sent to the domestic markets has traveled less than 200 versts (132.6 miles), while to the export ports the predominating distance was from 200 to 400 versts, or from 132.6 to 265.2 miles.

The preferential advantage of the southern ports is also well shown in the table. Since in the original this information is given in much greater detail, it was possible to calculate the average distance, which was 215 miles for the entire shipments, 224 for the domestic markets, 201 for the export ports, 170 for the southern ports, 459 for the land

frontier ports, and 827 for the Baltic ports. Thus, notwithstanding the proximity of many large cities to the wheat-producing region, the average distance traveled by wheat to export ports is shorter than that to the domestic markets.

TABLE 23.—*Distance which wheat is transported by railway to market, 1902.*

Distance.		All markets.	Internal markets.	Exporting points.	Ports of Azov and Black seas.	Ports on land frontier and foreign ports.	Baltic ports.
Versts.	*Miles.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
1– 200	1.0– 132.6	48,357,500	26,838,500	21,519,000	20,074,000	1,391,600	53,500
201– 400	132.6– 265.2	48,471,200	14,152,100	34,319,200	33,789,000	530,200	.....
401– 600	265.2– 397.7	9,275,500	3,556,500	5,719,000	5,465,600	54,800	198,600
601–1,000	397.7– 662.9	6,120,600	4,707,800	1,412,500	573,600	817,300	21,600
1,001–2,000	662.9–1,325.8	5,423,400	2,920,900	2,502,600	600	1,686,400	815,600
2,001–4,000	1,325.8–2,651.6	863,700	819,200	44,500	.....	1,800	42,700
Total....	.....	118,511,900	52,995,000	65,516,800	59,902,800	4,482,100	1,132,000
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
1– 200	1.0– 132.6	40.8	50.6	32.8	33.5	31.1	4.7
201– 400	132.6– 265.2	40.9	26.7	52.4	56.4	11.8	.....
401– 600	265.2– 397.7	7.8	6.7	8.7	9.1	1.2	17.5
601–1,000	397.7– 662.9	5.2	8.9	2.2	1.0	18.3	1.9
1,001–2,000	662.9–1,325.8	4.6	5.5	3.8	.....	37.6	72.1
2,001–4,000	1,325.8–2,651.6	.7	1.6	.1	.....	.....	3.8
Total....	.....	100.0	100.0	100.0	100.0	100.0	100.0

Waterway transportation facilities still more emphasize this advantage of location possessed by Russian wheat in regard to export trade.

In Table 24 are shown the quantities of wheat transported by certain rivers, including their tributaries. Five rivers—the Volga, Dnieper, Don, southern Boog, and Dniester—carry all but about 1 per cent of the wheat transported on all the waterways. The Volga is the greatest natural highway of commerce; but, because the Caspian Sea has no outlet, grain goes mainly up the stream to St. Petersburg through the system of canals. In fact over 90 per cent of the wheat shipments take the direction upstream. On the other four rivers, on the contrary, practically all the wheat goes downstream to the southern ports; only a minor part of the wheat shipped up the Volga is now destined for export.

AVERAGE HAUL ON RIVERS.

The average distance traveled by wheat on water is greater than by railway, varying in different years from 300 to 500 miles; but this is due to the great distances traveled by wheat up the Volga. As was shown in Table 14, the distance was much smaller for the wheat reaching the ports at the mouth of the Dnieper (83 to 129 miles), the southern Boog (56 to 65 miles), and the Dniester (115 to 213 miles), only on the Don are the average distances from 104 to 311 miles, and the average distance to the export ports, as shown in the last column of Table 23, varies between 85 and 175 miles.

TABLE 24.—*Shipments of wheat over Russian waterways, 1884–1903.*

Year.	Volga Basin.	Dnieper Basin.	Don Basin.	Southern Boog Basin.	Dniester Basin.	All other waterways.	Total shipments on waterways.
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
1884	29,739,000	2,521,000	1,321,000	.....	1,476,000	36,000	35,093,000
1885	21,449,000	4,562,000	1,006,000	.....	2,974,000	63,000	30,054,000
1886	19,060,000	3,646,000	1,706,000	.....	1,562,000	79,000	26,053,000
1887	19,119,000	6,505,000	2,155,000	.....	2,655,000	66,000	30,500,000
1888	13,846,000	8,747,000	2,736,000	.....	3,630,000	206,000	29,165,000
5-year average	20,643,000	5,196,000	1,785,000	.....	2,459,000	90,000	30,173,000
1889	14,034,000	10,598,000	2,959,000	.....	3,931,000	90,000	31,612,000
1890	13,958,000	8,854,000	2,442,000	.....	4,107,000	73,000	29,434,000
1891	13,377,000	7,866,000	4,650,000	2,312,000	2,752,000	53,000	31,010,000
1892	9,890,000	8,474,000	2,796,000	720,000	509,000	24,000	22,413,000
1893	14,833,000	13,010,000	2,813,000	1,961,000	354,000	12,000	32,983,000
5-year average	13,218,000	9,760,000	3,132,000	999,000	2,331,000	50,000	29,490,000
1894	17,842,000	16,202,000	3,981,000	4,340,000	293,000	26,000	42,684,000
1895	20,414,000	17,454,000	4,272,000	5,357,000	1,005,000	52,000	48,554,000
1896	22,109,000	13,323,000	6,302,000	5,057,000	1,208,000	65,000	48,064,000
1897	26,542,000	12,676,000	8,502,000	4,571,000	361,000	99,000	52,751,000
1898	25,571,000	12,138,000	7,946,000	3,696,000	510,000	70,000	49,931,000
5-year average	22,496,000	14,359,000	6,201,000	4,604,000	675,000	62,000	48,397,000
1899	18,488,000	8,918,000	5,796,000	2,301,000	458,000	275,000	36,236,000
1900	21,233,000	7,069,000	6,784,000	2,295,000	463,000	1,300,000	39,144,000
1901	25,013,000	7,424,000	6,320,000	3,928,000	746,000	1,877,000	45,308,000
1902	17,597,000	10,215,000	5,936,000	5,484,000	1,232,000	76,000	40,540,000
1903	24,451,000	20,607,000	9,081,000	6,718,000	1,788,000	344,000	62,989,000
5-year average	21,356,000	10,847,000	6,783,000	4,145,000	937,000	774,000	44,843,000

SIBERIAN WHEAT MOVEMENTS.

Fears which were felt by many people in the United States that, after the completion of the Siberian Railway, Siberia would become an important competitor in the wheat trade, necessitate a careful inquiry into the actual degree of participation of Asiatic Russian wheat in the Russian wheat trade. It was pointed out in Bulletin No. 42 that, while the possibilities of Siberian wheat growing were very great, migration to Siberia was as yet insufficiently organized, and therefore the extension of the Siberian area of cultivation had been none too rapid; the wheat acreage of western Siberia has increased from 2,905,000 acres in 1896 to 3,758,000 acres in 1905, or 29 per cent, and in central Asia from 1,329,000 acres in 1896 to 1,782,000 in 1905, or 34 per cent. For these two divisions together the increase of wheat acreage within this decade was from 4,234,000 acres to 5,540,000 acres, or 31 per cent. With an increase in acreage as slight as that, and a production subject to great variations, Siberia has evidently not yet shown any great tendency to overflood the wheat market. The completion of the Siberian Railway was expected to have a stimulating effect upon both wheat production and trade, but the recent events in the Far East, which have greatly taxed the carrying capacity of the Siberian Railway, have as yet prevented any such effect of the railway upon agriculture and commerce.

In Table 25 are shown the relations of the grain traffic, especially wheat, to the entire freight carried upon the railways of Asiatic Russia. Grain is seen to play an even more important rôle on the railways of Asiatic Russia than in those of European Russia, and, in view of the predominating importance of wheat in Siberian agriculture, it is not surprising to find that three-fifths to four-fifths of the grain and flour shipments consist of wheat and wheat flour.

TABLE 25.—*Total freight, all grain and wheat and flour, carried on the railways of Asiatic Russia, 1898–1904.*[a]

Year.	Total freight.	Total grain and flour.	Wheat.	Wheat flour.	Wheat and wheat flour.
	Tons.	*Tons.*	*Bushels.*	*Barrels.*	*Tons.*
1898	1,184,500	404,499	8,039,913	726,310	312,375
1899	1,384,384	397,584	5,743,741	853,257	255,931
1900	1,580,423	466,884	7,185,845	1,242,575	337,347
1901	2,042,377	539,688	5,660,080	1,464,595	313,332
1902	2,338,358	592,412	6,068,154	1,689,379	347,604
1903	2,609,583	586,291	7,254,460	2,236,783	436,839
1904	2,488,786	670,723	11,878,704	1,926,692	545,177

Year.	Per cent of total freight.				Per cent of total grain and flour.		
	Total grain and flour.	Wheat.	Wheat flour.	Wheat and wheat flour.	Wheat.	Wheat flour.	Wheat and wheat flour.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
1898	34.1	20.4	6.0	26.4	59.6	17.6	77.2
1899	28.7	12.4	6.0	18.5	43.3	21.0	64.4
1900	29.5	13.6	7.7	21.3	46.2	26.0	72.3
1901	26.4	8.3	7.0	15.3	31.5	26.6	58.1
1902	25.3	7.8	7.1	14.9	30.7	27.9	58.7
1903	22.5	8.3	8.4	16.7	37.1	37.4	74.5
1904	26.9	14.3	7.6	21.9	53.1	28.2	81.3

[a] Compiled from statistical reports of Ministry of Ways and Communications.

Within this short time the shipments of both wheat and flour have increased considerably. The variations from year to year are great, as are the variations in production; but a great part of the shipments is development of internal trade for local consumption. In proportion to the wheat crop the amount of wheat shipped is not great, even if both wheat and wheat flour are added together, and it must be pointed out that such addition exaggerates the actual quantity of wheat entering commerce, since considerable quantities of flour are sent to Siberia and central Asia from European Russia.

The data refer to all the railways in Asiatic Russia, which include the Siberian Railway, the Middle Asiatic Railway, and the Ussuri Railway. Very little wheat is shipped in the east. The shipments over the first two railways are shown separately in Table 26. The Middle Siberian Railway is isolated from other railroad systems of European Russia, and grain shipped over it does not reach the European markets. The movement of wheat over this railway is eastward, and a portion of this wheat, shipped from the port of Krasnovodsk

eastward, is European wheat. Only the shipments over the Siberian Railway are of importance in the export trade. The arrivals of wheat at Cheliabinsk, the connecting point of the Siberian and Russian Railways, are increasing in size and constitute two-thirds of the entire wheat shipments over the Siberian Railway. From Cheliabinsk it either proceeds along the Perm Railway to Kotlass, and then up the Northern Dvina to Archangel, or south along the Samara and Slatoust Railway. The comparative shipments of Siberian wheat along both these directions are also shown in the same table, as well as the arrivals of wheat at Kotlass. When the trade movements are thus studied, it is seen that only a small portion of the Siberian wheat as yet enters the world's trade, the main cause being that, in view of the comparatively higher economic level of the Siberian peasantry[a] most of the wheat is either locally consumed or supplies local markets which can be easily and cheaply reached.

The cost of transportation of Siberian wheat to either the northern or southern ports is quite considerable, especially in view of the breaking of the formula at Cheliabinsk. The wheat shipments to Cheliabinsk originate as far back as Petropavlovsk, or 322 miles, and the distance from Cheliabinsk to Kotlass is about 1,000 miles. According to the formula the rate would be about 50 cents per 100 pounds, or 30 cents per bushel. But special rates are granted for Siberian grain traveling in that direction—from 17.41 kopecks per pood for Cheliabinsk-Kotlass (1,000 miles), to 27.45 kopecks per pood for Mamliutka-Kotlass, a distance of 1,300 miles (24.8 cents and 39.1 cents per 100 pounds, or 14.9 and 23.5 cents per bushel). On the other hand, if the wheat be sent to the Baltic ports the cost is very much higher. Not only does the general formula apply to the distance from Cheliabinsk to St. Petersburg, through the lines Cheliabinsk-Perm, Perm-Vologda, and Vologda-St. Petersburg, recently completed (altogether about 1,500 miles, and about 44 cents per 100 pounds), but the break in the formula at Cheliabinsk adds an additional charge up to 17 cents per 100 pounds. Thus the difference in railroad transportation is almost 30 cents per 100 pounds, or 18 cents per bushel, and even if the cost of river transportation from Kotlass to Archangel be added—about 3 to 4 kopecks per pood (4.3 to 5.7 cents per 100 pounds, or 2.6 to 3.4 cents per bushel)—still the preferential advantage of the northern route during the navigation period is about 15 cents per bushel, so that Siberian wheat is forced to go to the port of Archangel. The inconveniences of that port are considerable, however, and it is questionable whether the facilities would be adequate were the shipments of Siberian wheat to grow more rapidly in the future than they have done in the past.

[a] Bulletin No. 42, Bureau of Statistics.

TABLE 26.—*Movement of Siberian wheat, 1898–1904.*

Year.	Wheat transported on—		Wheat arrivals at Cheliabinsk along Siberian Railway.	Siberian wheat shipped from Cheliabinsk along—		Total wheat arrivals at Kotlass.	Total wheat exported from Archangel.
	Middle Asiatic Railway.	Siberian Railway.		Samara-Slatoust Railway, southeast.	Perm Railway, northeast.		
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
1898	.....	7,833,000	7,538,000	[a] 9,812,000	420,000	.....	6,000
1899	354,000	5,375,000	4,557,000	2,334,000	1,820,000	194,000	114,000
1900	1,117,000	6,000,000	4,982,000	1,880,000	3,278,000	1,575,000	1,250,000
1901	1,667,000	3,948,000	1,747,000	410,000	1,825,000	1,820,000	1,759,000
1902	1,711,000	4,106,000	875,000	.....	866,000	.....	.....
1903	1,978,000	5,075,000	3,632,000	1,698,000	[a] 3,474,000	187,000	.....
1904	2,775,000	8,936,000	8,050,000	2,991,000	4,966,000	4,036,000	2,835,000

[a] Includes other than Siberian wheat—namely, that originating at Cheliabinsk and transported from other railways. This explains why the total shipments from Cheliabinsk along the two roads (Perm and Samara-Slatoust) are greater than the arrivals of Siberian wheat at Cheliabinsk for those two years.

Still other outlets are open to the Siberian wheat—either to take the all-rail route south, which would be still more costly, or by rail to Samara and down the Volga to Tzaritzin and by rail to Rostov; or, again, by rail to Samara and thence up the Volga to St. Petersburg. The last route is the cheapest, next to the specially provided route to Kotlass and Archangel, yet even on this route the breaking of the railroad rate formula at Cheliabinsk has a very depressing effect, for it makes a charge up to 17 cents per 100 pounds for the initial distance of 322 miles. Then the distance from Cheliabinsk to Samara, 940 versts (625 miles), adds about 26 cents per 100 pounds and the water route from Samara to St. Petersburg costs from 10 to 13 kopecks per pood (14.3 to 18.5 cents per 100 pounds), so that the total rate from Petropavlovsk to St. Petersburg would be over 53 cents per hundred pounds, or 32 cents per bushel. The price of wheat in the world markets is seldom so high as to permit such high transportation charges, even on the cheap Siberian wheat.

TABLE 27.—*Relation between wheat production and wheat shipments in Siberia, 1898–1904.*[a]

Year.	Production of wheat in—			Wheat and wheat flour carried on all Asiatic Russian railways.			Proportion of crop transported.
	Western Siberia.	Central Asia.	Total Asiatic possessions.	Wheat.	Flour in terms of wheat.	Total.	
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Per cent.*
1898	36,156,900	14,944,000	51,100,900	8,039,900	3,268,400	11,308,300	22.1
1899	45,473,000	14,937,900	60,410,900	5,743,700	3,839,700	9,583,400	15.9
1900	20,171,800	6,958,800	27,130,600	7,185,800	5,591,600	12,777,400	47.1
1901	16,503,600	9,644,900	26,148,500	5,660,100	6,590,700	12,250,800	46.9
1902	30,795,600	15,897,300	46,692,900	6,068,200	7,602,200	13,670,400	29.3
1903	48,669,700	20,995,000	69,664,700	7,254,500	10,065,500	17,320,000	24.9
1904	31,590,000	12,822,500	44,412,500	11,878,700	8,670,100	20,548,800	46.3
Average: 1898–1904	32,765,800	13,742,900	46,508,700	7,404,400	6,518,300	13,922,700	29.9

[a] Compiled from Bulletin No. 42 Bureau of Statistics, and the Statistical Reports of Russian Ministry of Finance.

EXPORTS BY FRONTIERS.

The main currents of the movement of export wheat may also be studied from the statistics of export by frontiers. The data are given in Table 28 for the years 1885–1904 and the proportionate distribution of the exports by five-year periods is shown in Table 29.

The amounts of wheat shipped from each "frontier" (that is, each part of the entire frontier line, including many ports) are found to vary considerably from year to year, depending mainly upon the total quantity exported, but the proportional distribution of the entire wheat exports among the frontiers is seen to be much more uniform, especially if five-year periods be taken. Because of the concentration of wheat growing within a region for which the southern seaports are the natural outlets, it is not surprising to find that through these ports more than 90 per cent is now exported.

The Azov Sea ports are really a part of the European Black Sea frontier and the latter is divided from the Caucasian Black Sea frontier by a purely theoretical line. From the Black Sea ports in 1885–1889 there was exported 81.87 per cent of the total wheat exports; in 1890–1894, 91.46 per cent; in 1895–1899, 85.86 per cent, and in 1900–1904, 90.39 per cent.

TABLE 28.—*Export of wheat by chief frontiers, 1885–1904.*

Year.	Black Sea, European.	Black Sea, Caucasian.	Azof Sea.	Prussian frontier.	Austrian frontier.	Baltic frontier.	All other.	Total.
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
1885	37,736,000	419,000	26,467,000	11,323,000	2,120,000	15,000,000	295,000	93,360,000
1886	20,246,000	2,691,000	17,533,000	3,238,000	893,000	10,239,000	242,000	55,082,000
1887	36,817,000	2,452,000	28,556,000	6,884,000	1,087,000	5,258,000	350,000	81,404,000
1888	62,853,000	1,443,000	49,117,000	11,930,000	858,000	2,651,000	389,000	129,241,000
1889	60,415,000	6,178,000	34,967,000	7,677,000	1,375,000	3,820,000	254,000	114,686,000
1890	47,377,000	9,475,000	37,783,000	5,244,000	1,594,000	7,811,000	309,000	109,593,000
1891	47,585,000	8,371,000	33,243,000	6,950,000	2,242,000	7,371,000	391,000	106,153,000
1892	17,067,000	4,678,000	24,781,000	2,001,000	92,000	331,000	137,000	49,087,000
1893	44,396,000	9,964,000	36,783,000	2,137,000	297,000	320,000	135,000	94,032,000
1894	67,104,000	10,482,000	41,873,000	2,364,000	931,000	258,000	216,000	123,228,000
1895	74,531,000	12,043,000	47,405,000	4,124,000	1,640,000	2,406,000	592,000	142,742,000
1896	68,965,000	10,995,000	38,595,000	5,565,000	1,554,000	6,083,000	409,000	132,166,000
1897	60,319,000	6,364,000	34,471,000	4,210,000	3,451,000	19,089,000	481,000	128,385,000
1898	48,440,000	5,639,000	26,870,000	3,329,000	4,095,000	18,063,000	424,000	106,860,000
1899	30,452,000	2,821,000	25,463,000	918,000	1,761,000	2,140,000	911,000	64,466,000
1900	28,888,000	3,859,000	28,167,000	487,000	889,000	6,622,000	1,433,000	70,345,000
1901	37,406,000	6,344,000	28,837,000	1,531,000	1,547,000	5,524,000	2,220,000	83,409,000
1902	63,393,000	6,192,000	35,847,000	2,675,000	2,025,000	887,000	958,000	111,977,000
1903	88,730,000	8,463,000	48,617,000	1,815,000	989,000	3,909,000	926,000	153,449,000
1904	75,564,000	11,584,000	59,775,000	1,693,000	1,931,000	14,882,000	3,629,000	169,058,000
Average:								
1885–1889	43,613,000	2,637,000	31,328,000	8,210,000	1,267,000	7,394,000	306,000	94,755,000
1890–1894	44,705,000	8,594,000	34,893,000	3,739,000	1,031,000	3,218,000	238,000	96,419,000
1895–1899	56,542,000	7,572,000	34,561,000	3,629,000	2,500,000	9,556,000	563,000	114,924,000
1900–1904	58,796,000	7,288,000	40,249,000	1,640,000	1,476,000	6,365,000	1,833,000	117,648,000

TABLE 29.—*Distribution of exports by frontiers and by five-year periods.*

Frontier.	1885–1889.	1890–1894.	1895–1899.	1900–1904.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*
Black Sea, European	46.03	46.36	49.20	49.98
Black Sea, Caucasian	2.78	8.91	6.59	6.20
Azov	33.06	36.19	30.07	34.21
Prussian	8.67	3.88	3.16	1.39
Austrian	1.34	1.07	2.17	1.25
Baltic	7.80	3.34	8.31	5.41
All other	.32	.25	.50	1.56
All frontiers	100.00	100.00	100.00	100.00

The shipments across the Prussian and Austrian land frontier have declined since 1889; the reason may probably be found in the regulation of railway rates since 1889 and 1893. The establishment of a mileage basis, though modified by the principle of differentials and the subsequent reduction of the differential, has made the shorter railroad haul to the southern ports cheaper than the all-rail route to the German markets. On the other hand, the recent reduction, in 1891, in the rates for short distances for the internal trade, as compared with the export trade (see p. 42), has protected the local Polish markets for the Polish wheat against the wheat of the far south and east, and so reduced the local surplus available for export in Poland.

Considerable variations are shown in the quantity of wheat shipped from the Baltic Sea ports, not only by annual but even by five-year periods. The exports in 1886 amounted to 18 per cent of the total Russian wheat exports and in 1893–1894 fell to less than one-third of 1 per cent. The large exports from Baltic ports in the beginning of the twenty years under discussion, in 1885–1886, are undoubtedly due to the lowering of the railway rate during the railway-rate war just prior to the regulation of 1888, which put an end to the war and generally raised the rates. In 1889 the first formula was elaborated, which made some reductions in railway rates on exported grain, and the exports from the Baltic ports rose thereupon for a year or two.

Another explanation must be sought in the comparative condition of crops in various parts of the Russian wheat belt.

The Volga, the greatest Russian inland waterway, has no outlet into the international market southward, and much the greatest proportion of grain shipped on the Volga goes up the river and by means of various canals and connecting rivers to the northern ports, including St. Petersburg. It is interesting to observe, therefore, that very high exports through Baltic provinces in 1885–1886 were preceded by an unusually large crop in 1884 in the lower Volga region, the high exports of 1890 and 1891 by the very large crop of 1889 in the same region, the high exports of 1897 and 1898 by the large crop of 1896, and the high exports of 1904 and 1905 by the large crop of 1904.

The rest of the frontier, including the entire border line north of the Baltic Sea, the entire northern line, and the Siberian border line, is of little importance in the Russian wheat export, as is seen from the column "All other" in Table 28. Slight exports of some interest have appeared within the last five years, mainly through the port of Archangel, on the White Sea; these consist of Siberian wheat, and the railway rate advantages which have sent some Siberian wheat to that northern route have already been explained.

EXPORTS BY PRINCIPAL PORTS.

Information as to the distribution of the exports by individual ports is given with considerable detail in Table 30, which should be read in conjunction with the treatment of port facilities. It was not thought necessary to give specific information in regard to the land ports on the western frontier, which have no independent commercial importance and are merely railway terminal stations, so that the data of shipments over the Prussian and Austrian frontiers as given in Table 28 are considered sufficient. The relative importance of the ports is seen to depend, not only upon their location with relation to the wheat area, but also upon their railway and waterway facilities. Thus, for example, the data for Rostov and Novorossiisk show how the latter port entered into competition with the former in 1889. The suspension of exports from Sebastopol has caused increased exports from Theodosia and other ports. The variations from year to year are considerable as a result of the variable crops in the regions having their outlets in a particular port.

TABLE 30.—*Exports of wheat by chief ports, 1885–1904.*

Year.	Chief Black Sea ports.						Chief Azov Sea ports.		
	Odessa.	Nikolaiev.	Eupatoria.	Theodosia.	Sebastopol.	Novorossiisk.	Rostov.	Taganrog.	Mariupol.
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
1885	27,247,000	6,024,000	697,000	1,237,000	1,695,000	.....	9,750,000	5,777,000	1,467,000
1886	12,690,000	2,539,000	431,000	1,145,000	3,114,000	.....	5,087,000	2,755,000	1,479,000
1887	22,591,000	9,086,000	678,000	681,000	3,181,000	3,000	11,552,000	4,923,000	1,878,000
1888	37,832,000	13,130,000	979,000	1,347,000	8,714,000	754,000	24,085,000	7,755,000	3,270,000
1889	35,723,000	10,821,000	2,527,000	1,815,000	8,385,000	6,169,000	13,241,000	5,701,000	2,586,000
1890	29,727,000	10,294,000	886,000	967,000	4,266,000	9,462,000	15,482,000	5,836,000	2,590,000
1891	28,298,000	10,984,000	748,000	762,000	4,995,000	8,325,000	12,504,000	5,947,000	3,044,000
1892	5,421,000	5,349,000	1,200,000	970,000	4,049,000	4,675,000	8,876,000	4,988,000	1,517,000
1893	19,070,000	14,508,000	2,274,000	1,425,000	5,691,000	9,940,000	15,702,000	5,715,000	3,186,000
1894	28,501,000	22,746,000	3,383,000	3,238,000	7,935,000	10,454,000	12,437,000	7,269,000	4,632,000
1895	36,414,000	24,293,000	2,228,000	2,370,000	5,662,000	12,022,000	19,003,000	7,561,000	4,678,000
1896	34,431,000	23,984,000	1,997,000	3,330,000	2,428,000	10,968,000	17,295,000	5,853,000	3,586,000
1897	28,401,000	23,833,000	904,000	4,385,000	617,000	6,358,000	14,653,000	5,923,000	3,447,000
1898	20,005,000	20,272,000	1,055,000	4,683,000	.....	5,639,000	13,077,000	4,638,000	2,422,000
1899	14,153,000	10,365,000	1,693,000	3,910,000	.....	2,794,000	10,249,000	2,910,000	2,653,000
1900	13,250,000	7,467,000	2,824,000	4,432,000	.....	3,765,000	12,833,000	3,895,000	3,215,000
1901	16,514,000	13,231,000	2,238,000	3,185,000	.....	6,217,000	11,850,000	4,207,000	2,400,000
1902	27,613,000	24,317,000	2,203,000	5,907,000	.....	6,089,000	14,605,000	4,779,000	3,964,000
1903	42,022,000	32,950,000	1,720,000	6,034,000	.....	8,374,000	23,497,000	5,698,000	4,493,000
1904	30,949,000	29,414,000	2,978,000	8,954,000	.....	4,455,000	25,003,000	8,830,000	7,369,000

TABLE 30.—*Exports of wheat by chief ports, 1885–1904*—Continued.

Year.	Chief Ázov Sea ports—Con.			Chief Baltic Sea ports.				All other ports.	Total exports.
	Berdiansk.	Genichesk.	Eisk.	St. Petersburg.	Reval.	Riga.	Libau.		
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*
1885	5,398,000	158,000	2,109,000	11,510,000	2,695,000	443,000	78,000	17,075,000	93,360,000
1886	5,552,000	484,000	978,000	9,466,000	665,000	112,000	73,000	8,512,000	55,082,000
1887	5,370,000	216,000	2,104,000	4,239,000	730,000	297,000	6,000	13,869,000	81,404,000
1888	6,562,000	756,000	3,801,000	1,775,000	247,000	613,000	118,000	17,503,000	129,241,000
1889	7,091,000	843,000	4,559,000	2,210,000	845,000	672,000	111,000	11,387,000	114,686,000
1890	6,565,000	1,585,000	4,471,000	3,747,000	2,414,000	1,668,000	34,000	9,599,000	109,593,000
1891	6,315,000	1,488,000	2,923,000	4,017,000	1,426,000	1,929,000	47,000	12,398,000	106,153,000
1892	3,790,000	517,000	3,318,000	27,000	.....	278,000	29,000	4,083,000	49,087,000
1893	6,169,000	1,222,000	3,685,000	172,000	19,000	137,000	.....	5,117,000	94,032,000
1894	7,846,000	3,156,000	5,325,000	24,000	136,000	99,000	.....	6,047,000	123,228,000
1895	7,383,000	2,741,000	4,402,000	1,631,000	469,000	306,000	4,000	11,575,000	142,742,000
1896	6,230,000	1,907,000	2,587,000	2,504,000	2,067,000	1,495,000	17,000	11,482,000	132,166,000
1897	5,360,000	2,435,000	1,941,000	5,916,000	6,551,000	4,743,000	1,879,000	11,039,000	128,385,000
1898	4,191,000	1,272,000	1,121,000	4,336,000	6,667,000	2,365,000	4,697,000	10,420,000	106,860,000
1899	3,939,000	1,602,000	2,403,000	844,000	641,000	304,000	350,000	5,656,000	64,466,000
1900	3,566,000	995,000	2,344,000	1,711,000	1,928,000	1,586,000	1,397,000	5,137,000	70,345,000
1901	3,386,000	1,049,000	3,693,000	677,000	1,957,000	1,153,000	1,737,000	9,915,000	83,409,000
1902	4,732,000	1,426,000	4,132,000	475,000	92,000	252,000	68,000	11,323,000	111,977,000
1903	6,664,000	2,295,000	3,963,000	703,000	1,482,000	1,670,000	54,000	11,830,000	153,449,000
1904	7,825,000	3,425,000	4,455,000	3,399,000	4,260,000	4,876,000	1,363,000	21,503,000	169,058,000

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CIRCULARS.

No. 15. Foreign Trade in Farm and Forest Products, 1903. 1904.
No. 16. Foreign Trade in Farm and Forest Products, 1904. 1905.

REPRINTS FROM YEARBOOKS OF THE DEPARTMENT OF AGRICULTURE.

No. 304. The Nation's Farm Surplus. 1903.
No. 308. Consumption of Cotton in the Cotton States. 1903.
No. 319. The Industry in Oil Seeds. 1903.
No. 334. Statistical Matter Relating to Principal Crops and Farm Animals, Freight Rates, Exports, etc., of the United States, 1903. 1903.
No. 347. The Castor Oil Industry. 1904.
No. 357. Consumers' Fancies. 1904.
No. 370. Statistical Matter Relating to Principal Crops and Farm Animals, Freight Rates, Exports, etc., of the United States, 1904. 1904.
No. 400. Causes Affecting Farm Values. 1905.
No. 404. Statistical Matter Relating to Principal Crops and Farm Animals, Freight Rates, Exports, etc., of the United States, 1905. 1905.
No. 421. Foreign Restrictions on American Meat. 1906.
No. 430. Freight Costs and Market Values. 1906.
No. 436. Agricultural Statistics, 1906. 1906.